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THE DEVELOPMENT OF NEUTRALIZING SUBSTANCE FOR POLIOMYELITIS VIRUS IN VACCINATED AND UNVACCINATED INDIVIDUALS*

BY W. LLOYD AYCOCK, M.D.,† AND C. C. HUDSON, M.D.†

THE observation made early in the study of poliomyelitis that one attack confers a lasting immunity suggested the possibility of artificial immunization. Many attempts have been made to protect against the infection, particularly by the use of virus subjected to procedures designed to attentuate it. Aycock and Kagan[1] conducted a series of experiments with preparations of virus treated in various ways and failed to obtain either a highly efficacious or relatively safe method of immunization; in fact, the attenuated preparations proved but little if any safer than active virus. Since the method of attenuation seemed to have little bearing on the outcome, it was concluded that the results of injections of supposedly attenuated virus might have been determined rather by the particular tissue into which active virus was inoculated. The authors therefore attempted to immunize animals by such means as placing the virus in collodion sacs in the peritoneal cavity, by intranasal instillation and by intracutaneous injection.

Through a long series of intracutaneous injections, it was possible to produce neutralizing substance uniformly, and the animals so vaccinated in the majority of instances resisted intracerebral inoculation of active virus: eleven of twelve monkeys became immune. It is not clear whether the animal which succumbed (the second injected) developed the disease from intracutaneous injection or whether the virus was inadvertently introduced under the skin.

An additional thirty-five monkeys were subjected to shorter series of intracutaneous inoculations, receiving in all 340 injections of virus. Neutralizing substance was produced in only about half of the animals; half of this number later succumbed to intranasal instillation of active virus.

A further series of fifty-four animals were injected subcutaneously with from 1 to 50 cc.‡ of fully active virus, or with virus preparations which had been subjected to attenuating procedures, but which in all cases contained living virus. Each animal received from one to nineteen separate injections, 483 injections being given altogether. Only eleven of the fifty-four animals succumbed to subcutaneous injections of material containing active virus. Some monkeys withstood as much as 30 cc. of fully active virus, but failed to develop neutralizing substance, succumbing either to intranasal instillation or intracerebral inoculation. Neutralization tests were done on sixteen of the surviving animals: only nine neutralized the virus. Four of the ten monkeys later subjected to intranasal instillation of virus succumbed; six were able to withstand repeated intranasal instillation. Twenty-five animals were later inoculated intracerebrally, thirteen succumbing.

It appears from these experiments that the subcutaneous injection of active poliomyelitis virus, while relatively safe, is less effective in producing neutralizing substance or resistance to infection than intracutaneous injection. Furthermore, it would seem that the artificial production of neutralizing antibodies in the blood serum of the experimental animal does not necessarily confer immunity to infection. However, no firm conclusion can be drawn from these results concerning natural exposure, because it is not known how nearly intranasal instillation of virus approaches natural infection in regard to such factors as virulence and dosage.

DEVELOPMENT OF NEUTRALIZING SUBSTANCE IN THE HUMAN BEING FOLLOWING VACCINATION

During the summer of 1935, poliomyelitis was prevalent in a number of states on the eastern seaboard. An unusual increase in the number of cases in North Carolina in May marked the beginning of what was, for this southern state, an unusually severe outbreak. It reached its greatest intensity in the east central part of the state[2]. The outbreak attracted wide attention because the incidence is generally lower in southern than in northern states, and also because the seasonal increase was considerably in advance of that characteristic of northern states.

In the face of this unusual prevalence, vac-

*This work was financed by the Harvard Infantile Paralysis Commission and the Rockefeller Foundation.

†Aycock, W. Lloyd—Director of Research, Harvard Infantile Paralysis Commission. Hudson, C. C.—Health Officer, City of Greensboro, North Carolina. For records and addresses of authors see "This Week's Issue," page 742.

‡No attempt was made to use subinfective doses, since it was found that larger amounts so injected did not produce the disease, nor did they produce immunity with regularity.

cination, which has been recommended as a preventive measure against poliomyelitis, was used to a varying extent in a number of localities in North Carolina. Early in July, under the direction of the U. S. Public Health Service, a plan was formulated for administering the vaccine in such a way as to shed some light on its efficacy[3]. In Greensboro, somewhat to the west of the area of greatest prevalence, a group of about 300 children were chosen arbitrarily for vaccination and an equal number who applied were reserved as controls.

It was realized that statistically significant conclusions could be drawn from a comparative study of the occurrence of poliomyelitis in vaccinated and unvaccinated children only in the event that this particular city should be visited by an outbreak of a severe order, and of course this was questionable.* The authors felt that a study by means of the neutralization test on those vaccinated would afford evidence of the worth of the vaccine. The situation was particularly advantageous because tests could also be done at the same time on an equal number of individuals of the same ages who had not been vaccinated. From experience with the neutralization test, there are reasons for believing that an efficacious vaccine should produce neutralizing power in the blood serum.

In the experimental animal, infection with poliomyelitis virus results in immunity which can be detected by the neutralization test. This immunity is likewise present in human convalescents, as well as in a considerable proportion of individuals not known to have passed through an attack of the disease. From the distribution of this immunity in the population in general, the inference is that it results from exposure to the virus

The parallelism of the results of the neutralization test to the incidence of poliomyelitis at different ages and in different populations makes it appear that the presence of neutralizing substance may be taken as an indication of immunity to infection with the virus. However, it is not known whether this neutralizing property in the blood in itself affords the protection, or is merely an accompaniment of what has come to be designated as "tissue immunity". That the presence of this neutralizing substance may not actually constitute protection is suggested by the fact that the experimental production of neutralizing substance does not necessarily confer resistance to intracerebral inoculation or even intranasal instillation of virus.

The procedure was carried out as follows: Blood was drawn from those to be vaccinated, usually just previous to the injection of the vaccine, and at the same time from a corresponding number of control individuals. Second bloods were taken from both groups from thirty-one to seventy-seven days later (average sixty-one days), forty-eight being taken on the seventy-seventh day after the first bleeding.

The test was performed according to the method which has given fairly consistent results. A 5 per cent suspension of the spinal cord of a monkey sacrificed in the height of experimental poliomyelitis was mixed with an equal amount of the serum to be tested. The mixture was kept at 37°C. for two hours, and overnight in the icebox. Usually six to ten sera were set up in each experiment. As controls, normal monkey serum and convalescent serum were included in each experiment.

In three of the thirty experiments done, none of the animals succumbed. All these were done with a single specimen of virus. These experiments are not included in the results, since the indications are that this particular sample of virus was not active. In all the other experiments, roughly one-half of the monkeys succumbed. In four instances, normal monkey sera apparently neutralized the virus, but when the test was repeated they failed to do so. This discrepancy is in keeping with our previous experience, where such a divergent result has been obtained on an average one out of six times. However, since this error is reversible, it is believed that readings on any considerable number of tests are dependable. In the whole series of experiments, only once did the convalescent serum fail to neutralize the virus; however, this serum did neutralize in a number of repetitions.

It may be objected that the technic used in the neutralization test was not sufficiently delicate to detect degrees of immunity which would protect against infection, but which would not neutralize the virus. It may be said that the test was not so severe but that approximately half the children neutralized the virus in the beginning, a figure which is in keeping with epidemiologic expectations for those of similar age. Furthermore, it would be expected that if the vaccine increased the titer of immunity, some who did not respond to the test in the beginning would do so after vaccination.

First and second bloods from the same children were usually included in the individual experiments, as well as sera from both vaccinated and controls. The results of paired tests on sixty-three children are shown in table 1.

Single tests were also done on sera from thirteen vaccinated individuals and nineteen controls whose immunity status was not expected to change. Experience has shown that if the sera of the first bleeding neutralized the virus, it could be assumed that the second would do likewise; and that if the second blood, tested initially, did not show neutralizing property, neither would the first. These single tests and the assumptions made on the other of the pair are shown in table 2.

*No cases of poliomyelitis occurred among the vaccinated children, nor did any occur among those in the group who were not vaccinated.

TABLE 1

POLIOMYELITIS NEUTRALIZATION TESTS

Vaccine*	Vaccinated				Not Vaccinated			
	First Bleeding		Second Bleeding		First Bleeding		Second Bleeding	
	No.	Result	No.	Result	No.	Result	No.	Result
B	4	—	227	+	33	—	290	—
B	14	—	209	+	47	+	327	+
B	15	—	211	+	51	+	295	+
B	19	—	203	+	52	—	309	+
B	20	+	208	+	53	+	323	+
B	21	±	236	—	54	—	321	+
K	24	+	288	+	57	—	318	—
K	31	+	312	—	58	—	317	+
K	32	+	314	+	60	—	315	—
K	34	+	331	+	62	—	296	+
K	35	+	316	+	67	—	302	+
K	36	+	324	+	68	+	300	+
K	38	—	291	±	69	+	285	+
K	39	—	293	—	71	+	303	—
K	40	+	311	+	72	+	304	±
K	41	+	313	+	106	+	223	+
K	42	—	307	—	107	+	252	+
B	81	—	222	+	110	+	255	+
B	83	±	272	+	112	—	229	+
B	84	—	224	+	115	+	276	+
B	85	—	273	+	116	+	275	+
B	88	—	268	+	117	—	277	+
B	89	—	219	—	118	—	274	—
B	92	—	217	—	126	—	231	+
B	93	+	261	+	127	—	245	—
B	95	±	215	±	129	—	240	—
B	96	—	216	—	131	+	238	+
B	102	—	250	+	132	—	248	—
					135	—	262	—
					136	+	259	+
					137	—	247	—
					138	—	241	—
					139	—	235	—
					140	—	232	+
					141	—	246	—
	13+		21+		14+		22+	
	46.4%		75.0%		40.0%		62.8%	

\+ indicates blood neutralized the virus;
— indicates blood failed to neutralize.
* B, Brodie vaccine; K, Kolmer vaccine.

Attention should be called to the fact that the increase in immunity shown on table 1 cannot be interpreted as being of the order indicated, since there are included only those individuals on whom both tests were done. In other words, this tabulation considers those who became immune during the period of the experiment, but disregards a considerable number whose status obviously did not change. Table 3 summarizes the results of all the tests.

TABLE 2

POLIOMYELITIS NEUTRALIZATION TESTS

Vaccine*	Vaccinated				Not Vaccinated			
	First Bleeding		Second Bleeding		First Bleeding		Second Bleeding	
	No.	Result	No.	Result	No.	Result	No.	Result
B	1	+		+ A	27	— A	328	—
B	11	— A	202	—	46	— A	320	—
B	13	— A	210	—	61	— A	287	—
B	17	— A	204	—	64	— A	306	—
K	25	+	283	+ A	104	+	230	+ A
K	43	±	326	+ A	105	+	258	+ A
K	45	— A	322	—	109	— A	228	—
K	55	— A	289	—	111	±		+ A
B	80	+	270	+ A	114	+	280	+ A
B	86	+	267	+ A	119	+	278	+ A
B	90	+	220	+ A	122	+	282	+ A
B	94	+	254	+ A	128	— A	242	—
B	103	— A	253	—	130	— A	233	—
					134	— A	239	—
					142	— A	237	—
					147	— A	263	—
					148	— A	264	—
					150	+	265	+ A
					151	+	214	+ A
	7+				8+			
	54.8%				42.1%			

A indicates that the result was assumed: that if the first blood neutralized the virus, the second would do likewise; if the second blood did not neutralize, neither would the first.
* B, Brodie vaccine; K, Kolmer vaccine.

It will be noted that there was an increase in immunity in both groups under observation—19.5 per cent in the vaccinated and 14.9 per cent in the controls (table 3). In view of the irregularities of the neutralization test and the small number of observations, it is not clear that the slightly greater advantage of the vaccinated over the controls was the result of vac-

TABLE 3

POLIOMYELITIS NEUTRALIZATION TESTS

	Vaccinated						Not Vaccinated					
		First Blood		Second Blood				First Blood		Second Blood		
	Total	No. +	% +	No. +	% +	% Increase	Total	No. +	% +	No. +	% +	% Increase
Both bloods tested (Table 1)	28	13	46.4	21	75.0	28.6	35	14	40.0	22	62.8	22.8
One blood tested One assumed (Table 2)	13	7	54.8	7	54.8	0.0	19	8	42.1	8	42.1	0.0
	41	20	48.8	28	68.3	19.5	54	22	40.7	30	55.6	14.9

cination. The immunity increase may have been due, at least largely, to natural exposure. The occurrence of eight cases of poliomyelitis in the city during the period of the experiment is evidence that the virus was prevalent there at the time. Other factors, too, are concerned in the evaluation of the vaccines. In the first place, about half of those who were vaccinated were already immune according to the neutralization test, and so presumably would not be benefited. Secondly, a change from non-immune to immune occurred in about 24 per cent of those vaccinated and 17 per cent of the controls, an advantage of only about 7 per cent for the vaccinated group. This figure is very small, even assuming that the production of neutralizing substance affords protection. As a matter of fact, the experimental production of immunizing substance does not always constitute adequate protection against infection. In any case, the results of this work indicate that the value of vaccination against poliomyelitis as carried out in Greensboro was slight.

Certain other tests were done, sometimes on the first blood and sometimes on the second, where contamination of the other of the pair precluded comparative readings. These are not included in the report, but it may be said that the addition of these tests would not alter significantly the percentage of positive or negative findings in any of the groups.

Perhaps there would have been less confusion if the blood sera had been paired beforehand and equal numbers of tests done on vaccinated and control individuals. It was thought best, however, to conduct the series of neutralization tests on the sera as unknown. To this end, the identity of the samples was withheld until the outcome of the test had been recorded. Later, in order to insure the inclusion of a sufficient number of paired sera (that is, first and second bleedings from the same individual), this information was furnished, although the status of the individual, whether vaccinated or control, was not revealed until the result had been recorded.

The outcome of these tests affords an opportunity for emphasizing the danger of attempting to draw conclusions from small series of neutralization tests. The results obtained by another observer of tests performed on six children in Greensboro, before and after vaccination, were submitted to us for comparison. Before vaccination, five out of six failed to neutralize the virus. Four individuals neutralized the virus after vaccination. Thus, it might be concluded from this small experiment that the vaccine was highly efficacious in producing neutralizing substance.

On table 1, which records the results of our neutralization tests, the sera are arranged according to the numbers given when the blood was taken. Let us consider Nos. 84 to 93. These individuals possessed the same immunity status as did those in the primary tests done by the observer referred to above; that is, five failed to neutralize the virus before vaccination. Four of these were immune after vaccination. Again, if we refer to the controls on table 1, we shall find six consecutive specimens, Nos. 53 to 62, five of which failed to neutralize on the first test; three of these were immune on the later test. Thus, it will be seen that in dealing with a test of this sort, where on the average the results in the beginning are positive or negative in about 50 per cent, a reasonable number of tests must be done in order to show significant changes from this figure.

SUMMARY AND CONCLUSIONS

Tests to determine whether neutralizing substance was produced by two poliomyelitis vaccines in use in North Carolina were done on the blood of twenty-eight individuals before and after vaccination. It was found that 46.4 per cent were already immune. After vaccination, 75 per cent neutralized the virus, an increase of 28.6 per cent.

Neutralization tests on thirty-five control individuals showed 40 per cent immune on the first bleeding and 62.8 per cent on the later bleeding, an increase of 22.8 per cent.

It thus appears that there was a considerable increase in immunity in both vaccinated and control individuals. However, the actual increase in immunity is not so high as the figures indicate, for the reason that the tabulation does not include a number of individuals, both vaccinated and controls, in whom it was apparent from one test that there could be no change in immunity status. When these tests are included, the increase in immunity is 19.3 per cent in the vaccinated individuals and 14.9 per cent in the control individuals.

It is a question whether the somewhat greater increase in immunity in the vaccinated group is significant. Since an increase occurred in both vaccinated and control groups, it seems reasonable to infer that it was due, in large part at least, to natural exposure. The occurrence of eight cases of poliomyelitis in the city during the period of the experiment bears witness to the prevalence of the virus.

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A NOTE ON THE COMMON OCCURRENCE OF SERIOUS INVOLVEMENT OF THE HEART IN HYPERPIESIA

BY PAUL D. WHITE, M.D.*

IT is well known that essential hypertension (hyperpiesia) is compatible with seemingly good or excellent health in the first few years of its existence in the majority of patients and that it is in that period often an accidental discovery. It is also well known that if persistent and more than slight it usually leads, with or without other complications such as coronary disease, to enlargement of the heart and eventually to heart failure. As a cause of world-wide heart disease it looms high. Unfortunately by the time hypertensive heart disease itself becomes evident the condition has advanced to a stage where little but palliation is possible; heart failure may be checked or relieved for a few years but the fundamental factor—the hyperpiesia—is out of control, in the present state of our knowledge, despite the temporary effect of various more or less radical and nonspecific therapeutic measures.

Recently I have had occasion to make a survey of the cases of hypertension that I have seen in my practice as cardiac consultant. Certain interesting and somewhat unexpected findings and the depressing results of a follow-up study have caused me to present this brief note.

In fifteen years among 5,808 patients (3,396 or fifty-eight per cent males and 2,412 or forty-two per cent females) with symptoms or signs suggesting the possibility of cardiac abnormalities there were 1,249 cases with hypertension (twenty-two per cent).† Almost every case was of the type of essential hypertension or hyperpiesia; only forty-nine were thought to have any important degree of nephritis and only a few of those gave indications that the nephritis was primary rather than secondary. Only two cases were recognized as having congenital coarctation of the aorta. Almost every case had had hypertension for at least a few years before consulting me; a common duration of known hypertension was five to ten years; in a few cases the known duration was but a few weeks or months or as long as twenty or twenty-five years.

Cardiac enlargement was discoverable without great difficulty in the majority of the cases, and it was doubtless present even if not discernible clinically in many others; a few cases might be styled potential hypertensive heart disease but there were doubtless far fewer of these in my practice than in that of the average family doctor or insurance examiner or specialist in hypertension itself. It is probably the difference in the types of practice that explains some of the other findings which may be in contrast to those of general practice.

Among the 1249 hypertensive cases there were 644 males (fifty-one per cent) and 605 females (forty-nine per cent) (making up nineteen per cent of the total of 3,396 males in the entire series of patients and twenty-five per cent of the total of 2,412 females), in contrast to the reputed great preponderance of females with uncomplicated hyperpiesia.

Satisfactory analysis of the community at large has not yet been made, however, with reference to the sex incidence of early or uncomplicated hyperpiesia. Certain selected groups have been reported in which the female incidence has been found greater than the male, for example in the Outpatient Department of the Boston City Hospital where women made up 76.1 per cent and men 23.9 per cent of 1,787 cases (corrected for sex incidence in total cases to 74.3 per cent and 25.7 per cent respectively)[1].

My cases belonged preponderantly in the older age groups: thirty-three under forty years, 126 between forty and fifty, 386 between fifty and sixty, 467 between sixty and seventy, and 237 over seventy; thus the great majority (sixty-eight per cent) were between fifty and seventy. Males and females were almost evenly distributed in the age groups.

Angina pectoris was present in 329 of the cases (twenty-six per cent) when they first consulted me. A fact of great interest concerning the relationship of hypertension and angina pectoris in the total series of 5,808 patients is that there were almost as many females as males with both conditions, 147 women compared with 182 men out of the total of 329 cases, in contrast to the great preponderance of men over women (782 compared with 247) of the 1,029 cases of angina pectoris in the entire group. Thus only 182 of 782 males with angina pectoris had hypertension, while there were 147 hypertensive cases among the 247 females with angina pectoris.

Coronary thrombosis had occurred in recognizable form in ninety-nine cases (eight per cent) and came later in others. Congestive heart failure was the chief cause for the consultation in 308 cases (twenty-five per cent) and was a later complication in many more. It frequently took the form of pulmonary congestion, often acute as in cardiac asthma; in fact pulmonary congestion with dyspnea was the first evidence of failure in nearly every case except when the whole heart quickly failed or some

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†If we exclude the unimportant cases of certain functional disorders, the percentage becomes twenty-seven (of the so-called "organic" cases).

complication like mitral stenosis was also present to cause earlier failure of the right ventricle with resulting dropsy. Coronary thrombosis sometimes seemed to be the exciting factor for the congestive heart failure in this series of hypertensive cases.

Rheumatic heart disease was definite in forty-three of the cases, with mitral stenosis in twenty-three of them. Cardiovascular lues was clearly present in only ten patients and thyrotoxicosis in six. Aortic regurgitation without evident stenosis was present in fifty-two cases, while aortic stenosis was present in thirty-three and was frequently of high degree—a surprising finding. At least two cases had dissecting aortic aneurysms, as proved by autopsy.

Auricular fibrillation was present in 170 of the cases, being paroxysmal in fifty-five. Fifty-eight patients complained of paroxysmal tachycardia with regular rhythm. Many cases had premature beats. The great majority of the patients were electrocardiographed; thirty-four showed auriculoventricular block and forty-three intraventricular block; most of the cases showed left axis deviation with or without inversion of the T waves in Lead 1.

Neurocirculatory asthenia was present in easily recognized degree in 137 of the 1249 cases, diabetes in eighteen, and gout in seven. Seventy-four of the patients had had apoplexy and a number more developed this complication later.

The causes of death were determined in 100 consecutive cases (sixty-five male, thirty-five female). Ninety-five died "cardiovascular-renal" deaths: fifty-three from congestive failure (including seven from acute pulmonary edema), twenty suddenly (known angina pectoris in five of these and Adams-Stokes attacks in another), eleven from acute coronary thrombosis, six from apoplexy, and five from uremia. Five died as the result of infection, including three from pneumonia. The ages at death in this series of 100 cases were between thirty and forty years in two, between forty and fifty in five, between fifty and sixty in twenty-three, between sixty and seventy in forty-two, between seventy and eighty in twenty-six and over eighty in two.

Thus the great majority (seventy-two per cent) died before the age of seventy and of cardiovascular disease closely connected with the hypertension; few lived long lives.

It is true that our ignorance of the fundamental causes of hyperpiesia and of their cure does not allow us as yet to prevent the condition or to control it even at its inception, but it is also quite clear that the earliest weeks or months of the disease present the most favorable time for a study of its causative factors and for attempts to retard its progress. To discover the onset of hyperpiesia in any patient, to study it then, and to begin whatever sedative or other therapy seems effective should be, it seems to me, one of the aims of the practitioner of medicine whether he be engaged in family practice or in routine institutional or life insurance medical work as Palmer[2] and others have suggested. To accomplish this aim nothing short of annual examinations of all adults is possible. This will doubtless come to pass some day.

There has been a tendency in the postwar period to swing too far from the old extreme of great and general fear of high blood pressure to the other extreme of reassurance and relative neglect because we wish to avoid making our patients neurotic and particularly since we are still ignorant of the cause and the cure of hyperpiesia. We should, however, face the facts and take the middle course.

In conclusion, then, as the result of a discouraging experience with chronic and advanced hypertensive heart disease, I would urge the early discovery of hyperpiesia in patients and more intensive study and attempts at treatment at its onset.

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THE RADIOLOGICAL MANAGEMENT OF CANCER OF THE BREAST*

BY RICHARD DRESSER, M.D.,† AND VALMORE A. PELLETIER, M.D.†

THE radiological management of cancer of the breast is not a standardized procedure. Much controversy still exists as to the indications for roentgen and radium treatment and the dosages employed. It is the purpose of this article to set forth as concisely as possible the radiation methods now in use in several of the cancer clinics in Massachusetts. This is done with the full appreciation that some of these methods are at variance with those of other workers.

The treatment of early localized cancer of the breast is primarily a surgical problem. When the disease is confined to the breast and there are no axillary or distant metastases, five-year

*Material for this publication has been collected from the Pondville Hospital at Norfolk (Massachusetts State Cancer Hospital); the Collis P. Huntington Memorial Hospital, Harvard University; and the Memorial Hospital, Worcester, Massachusetts.

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cures should follow radical mastectomy in 50 per cent to 70 per cent of the cases. When the axillary glands are involved, this figure is reduced to about 25 per cent. The best radiological treatment can scarcely hope to improve or even equal these results. Unfortunately all cases are not amenable to surgery.

In a series of 600 cases collected from several representative cancer clinics, 38.5 per cent were considered suitable for radical mastectomy, 31 per cent were inoperable, and 30.3 per cent showed recurrence after operation elsewhere. Most of the inoperable and recurrent cases (more than 60 per cent of the entire group) were treated radiologically and the roentgenologist was called upon for help in many of the more favorable cases.

One may conveniently establish four groups: (1), primary operable cases; (2), cases inoperable because of the extent of the disease locally, the presence of distant metastases, or the unfavorable general condition of the patient; (3), cases presenting local recurrence or metastases following surgical removal of the breast; (4), cancer of the breast in young women.

GROUP I. PRIMARY OPERABLE CASES

The clinical criteria of operability are well known. The mass should be movable on the chest wall; the skin should not be extensively involved. A carcinoma which has eroded the skin and broken down may still be operable, whereas if there is a diffuse lymphatic invasion of the skin, the so-called inflammatory type, surgery is contraindicated. Moderate involvement of the lower axillary glands does not contraindicate operation, but reduces greatly the chance of cure. Enlargement of glands above the clavicle contraindicates surgery.

The differentiation of benign and malignant tumors of the breast by means of soft tissue radiography as recommended by Warren has, in our experience, proved of little value. In a series of 100 cases in which radiographs of the breast were made, we were usually able to confirm a positive clinical diagnosis of cancer, but in those cases which were clinically doubtful the roentgenograph was often misleading. In several instances, sharply defined nodules which were interpreted as benign proved, on histological examination, to be malignant.

One of the most important contraindications to surgery is the presence of visceral or bony metastases. Even though the local growth seems operable, these secondary deposits may be present and give no symptoms. Metastases in the lungs and bones can usually, but not invariably, be demonstrated by roentgen examination.

The results in a series of 500 cases of cancer of the breast examined roentgenologically with a view to determining the incidence of pulmonary and osseous metastases will be briefly discussed. A more detailed report of this study will be presented in a subsequent communication. Of the 500 cases examined, 293 showed no metastases; seventy-three showed metastases to the lungs only; eighty-six had metastases in the bones only; and forty-eight showed metastases to both bones and lungs. (Table 1.) The distribution of bone metastases in order of frequency is shown in table 2.

TABLE 1

CARCINOMA OF BREAST

Total Cases Examined	500	100.0%
No Metastases	293	58.6%
Metastases to Bones or Lungs	207	41.4%
Metastases to Lungs Only	73	14.6%
Metastases to Bones Only	86	17.2%
Metastases to Both Bones and Lungs	48	9.6%

TABLE 2

CARCINOMA OF BREAST

Total Cases Showing Bone Metastases	134	100%
Pelvis	86	64%
Spine	84	62%
Lumbar Spine	68	50%
Dorsal Spine	54	40%
Cervical Spine	23	17%
Skull	60	44%
Extremities	57	42%
Shoulder Girdles	42	31%
Ribs and Sternum	42	31%

It will be noted that metastases in the bones occur with slightly greater frequency than metastases in the lungs. It is, therefore, fully as important to examine the skeleton preoperatively as it is the lungs. This immediately raises the question of expense. In only one case in the entire series was a metastasis discovered in an extremity without concomitant involvement of the skull, spine, pelvis or lungs. It is therefore not essential to include the long bones in the routine examination of the skeleton. This makes a very appreciable reduction in the cost. It is now our practice to take the following films preoperatively: a lateral view of the skull (8 x 10 film); a lateral view of the dorsal spine (14 x 17 film); an anteroposterior view of the lumbar spine and pelvis including the upper ends of the femora (14 x 17 film); a posteroanterior view of the chest (14 x 17 film). If this preoperative roentgen examination is carried out routinely, a number of useless mastectomies will be avoided and the surgeon will be spared the discomfiture of having patients return a few months or even weeks after operation with symptoms from metastases which were in reality present before operation.

If it is concluded that the local growth is operable and that there are no distant metastases,

the question of preoperative radiation arises. There are many advocates of this procedure, foremost among them the Radiumhemmet in Stockholm. In our opinion there are several disadvantages to preoperative radiation which outweigh the possible benefits: first, many cancers of the breast are not particularly radiosensitive and the delay of several weeks which preoperative radiation entails should be avoided; secondly, to obtain regression of a cancer of the breast the radiation dosage must be sufficiently large to produce a severe erythema of the skin. This frequently causes some delay in healing of the wound postoperatively. More important, however, is the danger of late radiodermatitis. We have seen a number of cases of carcinoma of the skin which developed many years after the original cancer of the breast had been cured. There is also some danger of damage to the lungs which results in pulmonary fibrosis. When radiation offers the patient the only hope of cure or greatly enhances the possibility of cure, one is justified in chancing the development of late untoward radiation reactions. Surgery will eradicate the disease *locally* in about 80 per cent of the operable group. Most of those who die succumb to glandular, visceral, or bony metastases. Thus it seems unwise to subject this entire group to the hazard of radiation damage when benefit will accrue to hardly more than twenty per cent. It is our opinion that preoperative radiation should not be practised routinely, but should be limited to a small group of borderline cases in which there is some doubt as to the possibility of completely eradicating the disease by surgery.

Next to be considered is postoperative radiation. The danger of late untoward radiation reactions applies here as it does with preoperative radiation. We have discontinued routine postoperative treatment, but there are, however, certain cases in which it is indicated: first, when there has been a simple amputation of the breast without dissection of the axilla; secondly, when there is gross or microscopic disease in the axillary nodes; thirdly, women who have not passed the menopause. This last group will be discussed under a special heading.

A word should be said regarding the radium treatment of operable cancer of the breast. This is carried out by implanting long platinum needles of low radium content (2 or 3 milligrams) or "gold wires" containing radon (radium emanation). The implants are usually left in place for about a week giving a dose of from 10,000 to 20,000 milligram hours. This method is available in only a few clinics which possess the necessary apparatus. Although encouraging results have been reported by several workers, it is our belief that this procedure should not be recommended as a substitute for surgery in favorable cases.

GROUP II. INOPERABLE CASES

About 60 per cent of the cases of carcinoma of the breast presenting themselves at a cancer clinic are unsuitable for surgery. Radiation is the best method available at present for the treatment of these unfortunates. If the disease has not progressed beyond the axillary and supraclavicular glands and the patient is in good general condition, intensive radiation to these areas is indicated. Proper treatment will frequently result in regression of the disease and marked palliation. If distant metastases have developed, the case may be considered hopeless and one is scarcely justified in intensive radiation of the local lesion. High-voltage roentgen rays produced by at least 200 kilovolts peak with a filter of at least one-half millimeter copper are employed. The breast is irradiated by the "cross-fire" method with the patient lying on the affected side. The rays are directed from below upward through a large field covering the lateral aspect of the breast and axilla. When this area has been given the desired dosage the rays are directed from an overhead tube to the medial aspect of the affected breast with the patient still lying on the affected side. A third field including the supraclavicular area is frequently employed. With this technique excessive dosage to the lung is avoided since it is irradiated only through the lateral portal. The roentgen (r) unit which is based on the amount of ionization produced by the rays in one cubic centimeter of air is accepted as the standard of dosage. All r measurements reported in this article are made without back-scattering of rays from the patient. Seven hundred r will produce a mild skin erythema when given through a fifteen by fifteen centimeter portal in one sitting. Treatments are given in daily doses of 300 r to 400 r. A total of 1500 r to 1600 r is delivered to the lateral portal and a similar dose to the medial portal. The entire treatment is completed in eight to ten days. About a week after the completion of the series, a stiff erythema with some blistering develops which may cause the patient much discomfort for several days. This reaction will always clear up and the patient should be assured of this fact. Following the treatment to the breast it is often advisable to irradiate the supraclavicular region giving a total of 1600 r to 1800 r in daily doses of 300 r to 400 r. Occasionally the local lesion is treated by the implantation of radium needles as described under Group I, and sometimes by a combination of radium and roentgen rays. One may expect regression of the disease in a large percentage of cases which are intensively radiated. Following this intensive radiation subsequent treatment must be given with great caution, since the normal tissues never recover completely from this dosage.

When the disease recurs in an area which has been heavily radiated it sometimes progresses

with great rapidity. This is particularly true of the inflammatory type of cancer. These extensive recurrences are sometimes mistaken for a radiodermatitis.

The direct effect of radiation on distant metastases is usually disappointing. Occasionally deposits in the parenchyma of the lung may regress with dosages of about 1200 r to the front and back of the chest, and the accumulation of fluid resulting from involvement of the pleura may sometimes be retarded. Metastases to the abdominal viscera, particularly the liver, are refractory and it is useless to radiate them. Bone metastases show little response to direct radiation, but in young women may regress secondarily following cessation of ovarian function. This will be discussed more fully under Group IV. Irradiation may have a marked analgesic effect, particularly in those cases with involvement of the spine. Complete relief from pain is often secured by moderate dosages even though there is no demonstrable regression of the metastatic process. As little as 600 r to 800 r delivered over the spine may serve to make the patient comfortable for a period of months.

GROUP III. POSTOPERATIVE RECURRENCES

The percentage of local recurrences following radical mastectomy should be small provided the cases have been properly chosen for operation. These recurrences may appear as small superficial nodules in the skin, many of which may be easily palpated although they are not visible. Such lesions often do exceedingly well with roentgen ray dosages of 1500 r to 1800 r given in a period of a week or ten days. The larger, more indurated areas of local recurrence with involvement of the chest wall are less responsive, but many of these lesions may also be controlled.

Postoperative axillary and supraclavicular recurrences are treated in much the same manner as described under Group II. When extension to the remaining breast occurs, the technique of radiation is essentially the same as that employed in an inoperable case. In exceptional instances, surgical removal of the second breast may be indicated.

The treatment of remote metastases has been discussed under the previous heading.

GROUP IV. CANCER OF THE BREAST IN YOUNG WOMEN

Cancer of the breast in young women is generally more malignant than in those who have passed the menopause, and ends fatally in a large percentage of cases.

Lee has tabulated the results of 191 cases of cancer of the breast in women under forty which were treated by radical mastectomy. At the end of three years only 15 per cent were alive and free of disease. A smaller series of forty-eight cases collected by one of us showed only 12.5 per cent free of disease three years after amputation of the breast. It is well known that a cancer of the breast may progress with unusual rapidity during pregnancy. There is much experimental evidence to show that some relationship exists between ovarian function and certain cases of breast cancer. Surgical removal of the ovaries was practiced in Germany as early as 1889 (Schinzinger) and in England in 1896 (Beatson). Palliative results were obtained in about one third of the cases of cancer of the breast in young women subjected to oöphorectomy. Castration can be more easily and safely carried out by high voltage roentgen radiation than by surgery. A dose of 600 r to the front and back of the pelvis respectively using a 15 x 15 centimeter portal at a distance of 50 centimeters will produce, within two months, a cessation of menstruation in the average-sized woman thirty-five or older. The dose in the region of the ovaries must be increased in younger women. This can best be accomplished by extending the focal-skin distance from 50 to 80 centimeters.

The results of ovarian radiation in fifty-nine cases of cancer of the breast with bone metastases have been reported in detail in another article. Thirty of these cases were women who had not reached the menopause and twenty-nine had passed the menopause. In 30 per cent of the premenopause group there was definite regression of the bone metastases following roentgen castration. These patients were relieved of symptoms for periods varying from several months to three years. In the postmenopause group there was not a single instance in which bone regeneration, following ovarian radiation, could be demonstrated.

The results of ovarian radiation in the advanced cases of cancer of the breast in young women have led us to extend the method to a more favorable group. When the growth is locally operable, a radical mastectomy is performed. About ten days after the operation, intensive postoperative roentgen treatment is given to the operative site. This consists of a series of daily treatments of 300 r to 400 r until a total of 1600 r to 1800 r has been reached. Radiation is then directed to the pelvis as above described. We are not prepared to draw definite conclusions from this group, but the results have thus far been encouraging. It is our hope that this régime may at least serve to delay local and metastatic recurrences in about one third of the cases. The danger of future pregnancy is eliminated which alone justifies the procedure.

DUODENAL STUMP CLOSURE IN GASTRIC RESECTIONS WITH A MODIFIED FURNISS CLAMP

BY HOWARD M. CLUTE, M.D.*

ALL surgeons who do resections of the stomach recognize both the importance of adequate duodenal closure and the difficulties which this maneuver may entail. No part of a gastric resection is more likely to be followed by fatal complications if improperly done than the closure of the duodenal stump. The writer has found that a modification of the Furniss clamp for intestinal anastomosis has been very successful in expediting and simplifying this stage of gastric resection, and wishes to report its use in several cases. It is felt that, with this modification of the Furniss clamp, a fairly standard technique of approach to duodenal closure can be established.

About a year ago an attempt was made by the writer to close the duodenal stump during a subtotal gastrectomy by placing the Furniss clamp on the duodenum and then folding over the cauterized surfaces while they were held by the Furniss pin. The procedure was accomplished with difficulty because the hinge of the clamp is at the distal end and because it was impossible to put the holding pin or needle in from the distal end. (Fig. 1.)

FIG. 1. Plate from manufacturer's advertising, showing Furniss clamp. Note hinge at distal end. Pin can be inserted only from proximal end of clamp.

A modification of the Furniss clamp was, therefore, worked out with the coöperation of Mr. George Hiller of Hiller & Heuser, Boston,

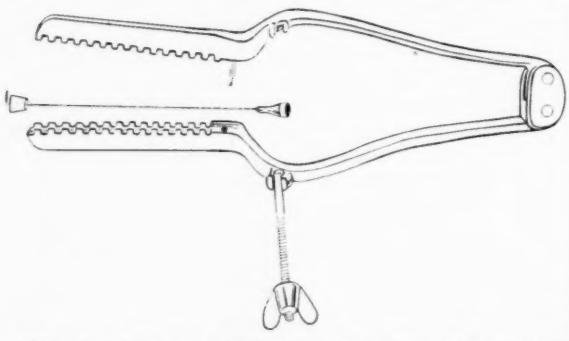

FIG. 2. Author's modification of Furniss clamp. Hinge at proximal end of clamp. Pin can be inserted from either end of clamp. Less crushing pressure is obtained with turnbuckle at center.

Mass., primarily for use in closing the duodenal stump in gastric resections. As will be noted in fig. 2, the hinge of the clamp is at the proximal end and a screw and turnbuckle for tightening the pressure is in the center of the clamp. The pin to hold the edges of the shirred gut together may be inserted from either the proximal or distal end of the clamp. This point is most important since in closing the duodenum a needle with catgut swedged on may be inserted from the distal end of the clamp through the entire width of the gut. This is impossible in the original Furniss clamp.

The writer has now used this modified Furniss clamp in three cases of subtotal gastric resection with excellent results. In fig. 3 the particular

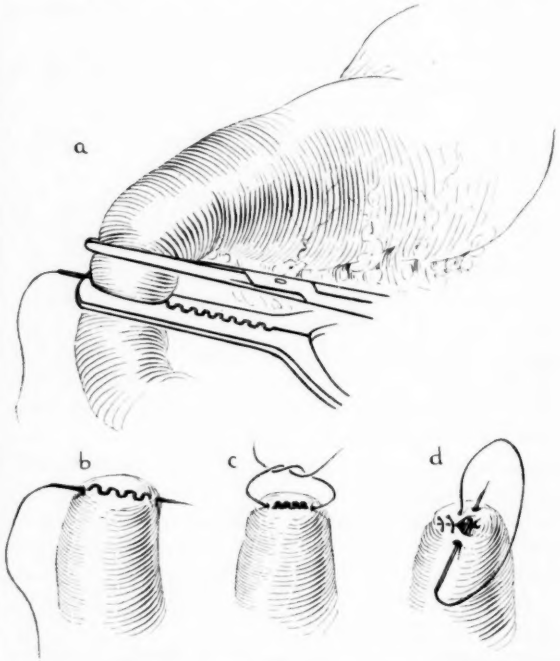

FIG. 3. Method of closing duodenum with modified clamp, using straight intestinal needle instead of pin to hold duodenum after division from stomach. Tying the suture closes the stump without soiling, and inversion can then be carefully done.

steps in the technique are shown. The stomach and duodenum are prepared for resection by ligation of the major blood supply along the greater and lesser curvatures. The modified Furniss clamp is applied in such a way that the edge of the duodenum as it is crushed comes just to the distal end of the clamp. In place of the usual Furniss pin a straight intestinal needle is inserted through the distal end of the clamp to hold the duodenum. (Fig. 3a.) An occlusive Ochsner clamp is placed proximally on the stomach.

The duodenum is now divided with the actual cautery and the modified Furniss clamp removed. This leaves the duodenal stump held tightly shut by the intestinal needle (fig. 3b)

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which can then be drawn through so that its attached suture puckers the shirred end as it is tied (fig. 3c). The duodenal stump is now still further occluded by either continuous or interrupted mattress sutures (fig. 3d). Adjacent fat is caught in with a third layer of mattress sutures and the duodenal closure is complete. Once the duodenum has been sufficiently freed to receive the clamp, its division and closure require but a few minutes.

The writer wishes to express his indebtedness to Dr. Furniss for the inherent advantages of this clamp and for the idea of using a threaded needle to close the end of the intestine. The change in Dr. Furniss's clamp which has been made, in no way alters its fundamental principles, but does, in the writer's opinion, make them more readily applicable, in certain situations, such as duodenal stump closure.

RECRUDESCENCE OF OVARIAN FUNCTION AFTER HEAVY IRRADIATION*

Two Cases

BY GEORGE VAN S. SMITH, M.D.†

RADIUM applied inside the uterine cavity in doses under 1000 milligram hours practically never induces a permanent amenorrhea in women under the age of thirty-five. This statement is based on limited experience, both at this clinic and elsewhere, in the treatment of patients with excessive and/or prolonged uterine bleeding or fibroids. The amount of irradiation necessary to bring about a permanent amenorrhea in these cases or in women with normal ovarian function is not established, although one would assume that at least 1200 milligram hours and probably 1600 to 2400 milligram hours would suffice. The size and position of the uterus and ovaries, the distance of the ovaries from the source of irradiation and the amount of filtration would have to be taken into consideration.

In the majority of women over the age of thirty-five, intrauterine application of 1200 milligram hours is generally accepted as adequate to produce a permanent menopause providing there is no tangible structural abnormality of the internal genitalia and the filtration does not exceed the equivalent of one millimeter of platinum. This dose might not be sufficient in cases of fibroids, since the tumors may displace the ovaries far enough away from the radium so that in reality they receive a comparatively small exposure. Nor would it be sufficient presumably in cases of ovarian tumors mistaken for fibroids, since enough functioning ovarian tissue might lie beyond the range of the radium. Furthermore, exception should be made in cases of granulosa cell tumor, in which the cells are so active in secreting the female sex hormone that 1200 milligram hours of radium might not inhibit them even though the tumor was so small as to be impalpable and the ovaries were not displaced. At this clinic one such instance in which radium failed to inhibit the bleeding associated with a granulosa cell tumor has been encountered.

The patient, Miss A. L. M., a private case of Dr. F. A. Pemberton, aged fifty-three, was seen in July, 1926, because of profuse bleeding four years after the climacteric. Biopsy revealed endometrial hyperplasia with polyp formation. At that time granulosa cell tumor was not suspected. The uterus was only moderately enlarged and no other pelvic abnormality was palpable. She was treated by the intrauterine application of radium (two 50-milligram glass capsules, screened by one-half millimeter of silver and one-half millimeter of brass, for 24 hours) —2400 milligram hours. Seven years and three months later the patient returned because of almost constant flowing "with hemorrhages at times". Complete hysterectomy was performed. The uterus was moderately enlarged. Marked endometrial hyperplasia, bordering on malignancy, diffuse hyperplastic adenomyosis of the uterine wall and a four-millimeter granulosa cell tumor (thecal cell type) at the median pole of the right ovary, which was not displaced, were found. Convalescence was uneventful and the patient remains well two and one-half years after operation. At the present time irradiation would not be employed in cases showing hyperplasia of the endometrium some time after a well-established menopause, since this finding constitutes an almost infallible criterion of the presence of granulosa cell tumor, the accepted treatment of which is operation.

The report of the following two cases is prompted first because they experienced periodic uterine bleeding after truly large doses of radium, secondly because functioning endometrium was obtained, thus indicating a return of ovarian activity, and thirdly because a survey of the literature indicates that no similar instances have been recorded.

CASE 1. Mrs. C. B., aged thirty-eight, was admitted on August 30, 1926, because of daily flowing for six weeks. She had had no pain and had been perfectly well until the present illness. She had had six children and three abortions. On examination the cervix was slightly lacerated and felt a little hard. No other pelvic abnormality was discerned. Biopsy revealed early but highly malignant squamous carcinoma in the endocervix and radium was applied. Two 50-milligram glass capsules, screened by one-half millimeter of silver and one

*From the Free Hospital for Women, Brookline, Mass.

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millimeter of red rubber, were placed in tandem in the cervical and uterine canals and four 25-milligram glass capsules, screened by one-half millimeter of silver and set around the periphery of a one-half millimeter brass pill box, were abutted against the cervix and vaginal vaults—200 milligrams in all—and were allowed to remain for thirty hours, giving a total dosage of 6000 milligram hours. The vagina was packed with gauze to hold the radium in place and to keep bladder and rectum away.

For six months following irradiation there was no flowing and only slight watery discharge. The patient then experienced what she considered regular and normal monthly periods. There were no hot flushes; she felt well and was gaining weight. In January, 1930, she had menorrhagia of three weeks' duration, followed by a return of normal cycles. During 1931 there was occasional slight intermenstrual staining. On examination in January, 1932, no palpable or visible evidence of pelvic disease could be found. She was again examined in April, 1932, because of menorrhagia of two weeks' duration and some scarring was felt in the broad ligaments. In May, 1932, she was examined under anesthesia. There was slight erosion of the cervix and biopsy showed only chronic inflammation. The fundus was enlarged to twice normal size; it lay in the second degree of retroversion and was freely movable. No adnexal abnormalities were palpable. The cervical canal was easily dilated and found to be smooth. The distance from the external os to the top of the uterine cavity was three and one-half inches. No polyps or irregularities were made out and the curettings showed the picture illustrated in figure 1. On rectal examination soft scarring was felt in the broad ligaments. Because of the menorrhagia and the endometrial activity the condition was considered dysfunctional and radium was the elected treatment; first, because the patient was well in all other respects; secondly, because the tissues had reacted so well previously to irradiation; and thirdly, because excessive obesity seemed to be a contraindication to operation. Two 50-milligram capsules covered with one-half millimeter of silver and placed in tandem in a one-millimeter brass tube were inserted into the uterine cavity and allowed to remain for sixteen hours—1600 milligram hours in all. Convalescence was satisfactory. When last examined, in January, 1936, nine years and four months from the time of her first admission, the patient was well and had had no flowing or discharge. No evidence of disease could be seen or felt.

FIG. 1. Path. no. 20347. Photomicrograph of endometrium (× 80) removed five years and eight months after the local application of radium, 200 milligrams for 30 hours. It shows late proliferation and some dysplasia.

Case 2. Mrs. B. L. O., aged twenty-seven, entered the hospital in March, 1927. She had come to the out-patient department because of prolonged flowing following her previous menstruation and was referred to the house at once because of a suspicious lesion of the cervix. She had had six pregnancies. A rush biopsy during anesthesia showed only chronic cervicitis, but the celloidin section later disclosed early carcinoma. Radium was employed—50 milligrams, screened by one-half millimeter of silver and one-half millimeter of brass, were inserted into the cervical canal and 175 milligrams, screened by one-half millimeter of silver, were distributed about the periphery of a pill box of one-half millimeter of brass, which was placed against the cervix and fornices—225 milligrams in all—and allowed to remain for twenty-four hours, giving a total dose of 5400 milligram hours. Convalescence was uneventful and an artificial menopause ensued. In August, 1928, the patient was examined under anesthesia because of occasional staining after intercourse. The upper third of the vagina was closed by adhesions, which were broken; the stenosed cervix was dilated. Biopsies showed only the reaction from irradiation. There was diffuse scarring across the pelvis, which was considered due to irradiation.

Again in September, 1931, the patient was examined under anesthesia. There was less induration across the pelvis, but the vaginal adhesions and cervical stenosis had recurred. The adhesions were broken and the cervix dilated. No evidence of cancer could be found; the curettings consisted of atrophied endometrium and necrotic tissue.

In 1933 the patient had what she considered regular and normal periods for six months. From January until August, 1934, she had had three periods. At this time she was again examined under anesthesia. No cancer could be detected; the uterine cavity was two inches deep and curettage disclosed a functioning endometrium, as shown in figure 2. Her latest follow-up was in December, 1935, eight years and eight months from the time of irradiation. She was well except for a rare hot flush when tired. Menstruation had been regular and normal since the fall of 1934.

Discussion. One's first thought is that these cases may have had ectopic ovarian tissue or a granulosa cell tumor. These possibilities cannot be ruled out in case 1, but seem unlikely, since the patient responded so well to the second treatment, remaining symptom-free thus far for three years and eight months. The diffuse enlargement of her uterus at the time of the second treatment, on the other hand, is a finding suggestive of the presence of a granulosa cell tumor. If case 2 had ectopic ovarian tissue, a return of function would have been expected sooner. The fact that her menstruation has been normal since reëstablishment is on the whole against the presence of a granulosa cell tumor, although one case with normal menstruation, normal endometrium and a granulosa

cell tumor has been encountered at this clinic. The finding of an endometrium showing the corpus luteum effect does not bear any weight for or against granulosa cell tumor, since secretory endometrium has been found in patients with these tumors when no other source of progestin could be demonstrated.

It could be argued that, since all the radium was not placed in the uterine cavity, the ovaries really may not have received much of the massive dose. In this connection it can only be stated that, thus far, none of nine similar cases similarly treated and surviving for the same periods have had a return of cyclic bleeding. Furthermore, the distance between the lateral fornices and normally located ovaries may not be more than one and one-half centimeters greater than that between the uterine cavity and the ovaries and may even be less to the outer poles than that from the uterine cavity.

FIG. 2. Path. no. 23276. Photomicrograph of endometrium (× 80) removed seven years and four months after the local application of radium, 225 milligrams for 24 hours. It shows the midsecretory phase and some dysplasia.

It has been commonly accepted that ovaries are endowed at birth with their full quota of primordial follicles. The hormone studies of recent years have cast doubt on this concept and suggest that follicles may be developed from the ovarian stroma in extrauterine life. The fact that case 2 had a secretory endometrium (indicating the presence of a corpus luteum and hence previous ovulation) after so long a period of amenorrhea may be interpreted as evidence for the evolution of a new crop of primordial follicles. It does not seem at all likely that any follicles which might have survived irradiation would have remained inactive for so long a time. Since only one biopsy of the endometrium from case 1 was made and did not show any corpus luteum effect, no deductions can be drawn as to whether follicles may have developed *de novo*.

SUMMARY

Two cases are reported which experienced cyclic uterine bleeding following massive doses of radium and from which biopsies revealed functioning endometrium, thus indicating a recrudescence of ovarian activity. The finding in case 2 of an endometrium showing the corpus luteum effect is taken as presumptive evidence for the development *de novo* of ovarian follicles after a long period of quiescence.

BENJAMIN SHATTUCK OF TEMPLETON—MEDICAL PRACTITIONER*

BY GEORGE CHEEVER SHATTUCK, M.D.†

ANCESTRY

BENJAMIN SHATTUCK, the subject of this paper, was of the fifth generation of Shattucks in this country. He belonged to the Littleton branch of the family, was born on November 11, 1742 in Littleton (Middlesex County), Massachusetts, but moved to Templeton (Worcester County), Massachusetts, and died there on January 14, 1794.

Besides the Shattucks of Littleton, other branches of the family were already established in Deerfield, Cambridge, Andover, Pepperell, Groton and Hollis in Massachusetts and there were still others in New Hampshire and in Connecticut.

The name of Shattuck has since become widely diffused in the United States, but it is possible that the lineage of all persons in America now bearing the name of Shattuck might be traced to a common ancestor; namely, to William Shattuck who was born in England in 1621 or 1622. There is no doubt, at any rate, that our Benjamin was descended directly from this William Shattuck, who arrived in Boston as a boy without parents or resources. As early as 1642 William Shattuck's name was recorded as owner of a small grant of land in Watertown. Probably most of his time was de-

*Read at a meeting of the Boston Medical History Club, at the Boston Medical Library, December 16, 1935.

†Shattuck, George Cheever—Assistant Professor of Tropical Medicine, Harvard University Medical School. For record and address of author see "This Week's Issue," page 742.

voted to farming but he bequeathed a loom to his son William.

William the younger (1653-1732) continued to live in the homestead in Watertown where he followed farming, brick-making and other employments such as were usual in the frontier life of those days. This William had a son, the Reverend Benjamin (1687-1763), who was graduated from Harvard College in 1709, studied theology there and, subsequently, was ordained the first minister of Littleton. The Reverend Benjamin had eleven children, of whom Stephen was the eldest. Stephen (1710-1801) became a farmer in Littleton and, at the age of sixty-five, took part in the Concord fight on the 19th of April, 1775, and followed the enemy to Cambridge.

Our Benjamin Shattuck, the second son of Stephen, became the first physician in his direct line of descent which, in the four succeeding generations, counts five physicians.* Among Benjamin's forbears and close relatives of the name of Shattuck, there had already been three other physicians.* They belonged respectively to the second, third, and fourth generations.

BACKGROUND

Although the massacre of the people of Deerfield by the Indians in 1703 could only have been remembered by old people at the time when Benjamin was born, there was, even in his youth, a line of forts in the southern part of New Hampshire. One of these, built by Capt. Daniel Shattuck (1692-1760), was called "Shattuck's Fort".† It was near the Connecticut River in Hinsdale and it consisted of two houses built on either side of a brook. They were enclosed in a strong palisade of timbers and thick planks, surmounted by pickets. In the upper part were posts for sentinels and holes to fire through. During the Indian Wars in 1745, and subsequently, the whole people of the neighborhood came to this fort to live. When the men of Hinsdale labored in their fields or went to church, they had their guns with them, and there were always sentinels on guard. In 1746 the Indians fired upon four men near Shattuck's Fort, but hurt none and, in 1747, they set fire to the fort at night and part of it was destroyed.

Although Benjamin's family and their neighbors had nothing to fear from Indians, the French and Indian Wars did not terminate until 1763 and, while Benjamin was growing up, stories of Indian fighting must have been narrated at the Shattuck fireside by actual participants.

As a boy, Benjamin doubtless made himself generally useful on his father's farm. He must have turned his hand to many things for, in those days, families living in the country produced the food they ate and raised the flax and wool which were to become linen and homespun, or knitted socks and undergarments for winter wear. The candle-mold was part of the necessary equipment and the warming-pan was in common use until a much later day. Travel was by stage-coach or on horseback. Boston, thirty miles away as the crow flies, could not be visited easily.

I imagine that the school at Littleton in those days was extremely elementary and that it absorbed little of the time or energy of the pupils. Benjamin was fortunate, however, in having been fitted to enter Harvard College by Jeremiah D. Rogers, son of the clergyman of Littleton.

An old pamphlet entitled "A Memoir of Dr. Shattuck", which is both anonymous and undated, bears internal evidence of having been written some years after the death of Benjamin. It seems quite possible that the author may have been Benjamin's son, Dr. George Cheyne Shattuck the elder. Extracts from this quaint document read as follows:

"While at Cambridge Shattuck was considered a young man of good capacity, a hard student, with an original cast of thought which sometimes . . . appeared like eccentricity.

"It was then a period remarkable for boldness of thinking, and freedom in the expression of liberal opinions on great national questions. . . . The spirit of liberty has always been first invoked in the groves of learning. The sacred flame which was soon to burn through the land and warm every breast was frequently seen at that time to flash and enlighten in the halls of Harvard. Among those whose observations are remembered by those few who were students at that time and are still living, Dr. Shattuck held a distinguished rank. In questions of philosophy as well as of government he was one of the pioneers in liberal discussion."

The freedom of thought and boldness of expression which existed in Harvard College in these early days indicate the political temper which led to revolution and denotes a falling away from the Calvinistic concepts of the Puritan settlers.

Benjamin Shattuck was graduated from Harvard with the Class of 1765, which, although it numbered only 54 members, was considerably larger than any of the earlier classes.

MEDICAL CAREER

After graduating from College, Benjamin went to Groton where he became apprenticed to Dr. Oliver Prescott, an outstanding physician and patriot. Prescott, also a graduate of Harvard College, had been trained in medicine by the apprentice system but, many years later, he received an honorary *M.D.* from Harvard.

*Appendix I.

†Captain Daniel Shattuck, of the Hinsdale branch of the family, was a distant cousin of Benjamin. See "Memorials of the Descendants of William Shattuck" by Lemuel Shattuck. 1855. Boston. Dutton and Wentworth.

Dr. Prescott had a large practice in the surrounding country where he made his professional calls on horseback. Thacher* says of Dr. Prescott that he had learned to sleep in the saddle when returning home from a distance at night, and that this faculty enabled him to do a tremendous amount of work.

Dr. Frederick C. Shattuck used to say that one of Benjamin's duties as apprentice was to take care of Dr. Prescott's horse. Doubtless, the apprentice did other chores as well, but he must have received from Dr. Prescott as good a medical training as was commonly attainable in the American Colonies in those days. This apprenticeship probably lasted four or five years, for the "Memoir" mentioned above indicates that Benjamin began practice in Templeton in the year 1770, and it says specifically that he settled there by invitation of the townspeople.

If one attempts to picture the physician, one should know something of the setting in which he lived and worked. Like many other New England towns, Templeton was built upon a hill and, in those early years, most of the houses may have been of logs. With reference to conditions of medical practice in those days, the "Memoir" says:

"The practitioner of the present day, with all the lights of the last half century about him, can hardly understand how much his predecessors suffered for want of books, instruments, and all the facilities which are at the command of the modern physician and surgeon. . . .

"The place Dr. Shattuck chose for the field of his exertions was a new settlement with but few inhabitants at that time. The population increased but slowly in the new corporations until after the Peace of 1763. Then, Indian warfare was no longer to be dreaded and the hardy sons of the colonies made rapid strides in cultivating the soil . . . Dr. Shattuck thought, and his visions were more than realized, that by the time his children had grown up there would be a comparatively dense population around him. With these hopes, his professional duties began.

"The life of a physician who has business, and with it entertains a high sense of his responsibility, is always an arduous one, but few can imagine the severity of his labours, who maintains a considerable celebrity in a new and thinly settled country."

In Thacher's account of Dr. Israel Atherton (1740-1822)†, there are passages which give further insight into the status of the physicians of that time. Dr. Atherton graduated from Harvard College in 1762 and began practice in Lancaster three years later. He had received his medical training under Dr. Edward A. Holyoke of Salem. Thacher says that, in most country towns, preparatory knowledge was deemed of little value, except for the pulpit or the bar; and that the practice of physic was only in name among the learned professions. When Atherton began practice, he was the only physician in the County of Worcester who had passed a course of collegiate studies, or commenced the profession of medicine under the advantages of a competent preparation. For a long period, he was the only physician in the county to become a Fellow of the Massachusetts Medical Society. "He lived, however, (says Thacher) to witness what he ardently strove to promote, an emulation among the faculty to elevate their profession to a respectable standing in science and substantial usefulness; and to see the patronage and preference which the community had so generally extended to imposters, in a great measure withdrawn—Hon. O. Fiske."

A word should be said at this point about hospitals and medical schools of the period. The history of these makes it highly improbable that any hospital was accessible to Benjamin Shattuck or to his patients.

The development of American medicine has been vividly portrayed by Mumford* and more fully described by Packard.† In the first half of the 18th Century, large general hospitals were unknown and no academic medical instruction was being given in the Colonies.

In 1751, Dr. Thomas Bond launched his plan for a great municipal hospital for Philadelphia. Of earlier hospitals, Mumford says (page 81) that "It must not be supposed that nothing in the nature of provision for the afflicted had ever been established before in the colonies. From the commercial character of the country, as Beck puts it, it may readily be supposed that our first medical establishments were lazarettos, or hospitals intended for the reception of seamen and others infected with contagious disorders. Such institutions existed in the Delaware and in Boston Harbor, and numerous small private institutions were established in different parts of the country to facilitate the practice of inoculation for smallpox, as that treatment came generally to prevail. But those were not hospitals in the all-embracing sense. They were small, very limited in their means and scope, and, in the lazarettos especially, the medical attendance was of the most meagre sort and the care of patients inefficient and often abominable."

Fortunately for Philadelphia, Benjamin Franklin, who had long been interested in medicine, took a hand in the campaign to raise funds

*James Thacher, M.D.: 1828. "American Medical Biography." Vol. I; p. 428. Richardson & Lord and Cottons & Barnard.

†Thacher: page 96.

*James G. Mumford: 1903. "A Narrative of Medicine in America." Phila. & Lond.

†Francis R. Packard: 1931. "History of Medicine in the United States." 2 vols.; New York.

for the proposed hospital in Philadelphia. Probably, he knew more about certain aspects of medicine than did many a practising physician of the time. In the words of Mumford (page 82):

"He recognized the futility of asking for subscriptions for so novel a project before a popular demand had been created, so he proceeded to create the demand. As he says, 'Previous, however, to the solicitation I endeavored to prepare the minds of the people by writing in the newspapers on the subject, which was my usual custom in such cases, but which Dr. Bond had omitted.' "

In the following year, 1752, a house was rented and made ready for patients. Such was the humble beginning of the Pennsylvania Hospital, the precursor of all our great general hospitals. The second great hospital, that of New York, was granted its charter in 1770 (Mumford: page 101). It was not equipped and started, however, until 20 years later (1791)*, and the Massachusetts General Hospital did not admit its first patient until 1821 when our Benjamin had been for many years in his grave.

Academic medical training began in Philadelphia in 1765 when Morgan and Shippen were appointed respectively to the chairs of the "Theory and Practice of Medicine" and of "Anatomy and Surgery". Three years later, Kuhn became Professor of "Materia Medica and Botany" and, in the year following, the great Benjamin Rush began his lectures as "Professor of Chemistry". It was during these years that Benjamin Shattuck was getting his medical training in Groton. Dr. Prescott must have known of the new School in Philadelphia but he may have hesitated to recommend it to his pupil until its worth had been proved by time. Probably, too, the pupil could not have afforded a visit to Philadelphia.

Be that as it may, in subsequent years Benjamin Shattuck studied the writings of Cullen of Edinborough and of other leaders of medical thought in Great Britain. Apparently, he admired particularly the works of George Cheyne† of London and Bath, for he named a son George Cheyne Shattuck. This son succeeded his father as a physician and became a leading practitioner and medical teacher in Boston.

Two years after beginning his medical practice, Benjamin Shattuck married Lucy Barron‡ of Chelmsford. They had seven children, of whom Dr. George Cheyne Shattuck the elder was the fifth.

When Benjamin Shattuck went to Templeton, the nearest sizable town was Worcester, which was about twenty-five miles distant in a direct line, whereas Boston was fifty-five miles away and it was forty-three miles to Springfield.

Worcester* had been settled in 1685, wiped out by the Indians in 1701, and resettled in 1715. By 1790, while Benjamin was still in active practice, the town of Worcester had 2095 inhabitants. Much Indian corn and rye were raised in Worcester County, but not much wheat, because rye did better there. The natural forest growth consisted largely of oak, walnut, chestnut, and pine. In or near the town were gristmills, sawmills, fulling-mills and trip hammers.

Moreover, from Worcester as the center, "West India goods" were supplied to the surrounding country, for Worcester was on the great post-road from Boston to Springfield, and various other roads converged there.

I imagine that Benjamin Shattuck occasionally went to Worcester on horseback to see a patient or to make a purchase. His medical equipment must have been carried in saddle-bags. In them he may have had a variety of potent purgatives and emetics, some surgical instruments and a lancet for blood-letting. Certainly, he did not have a stethoscope, for Laennec did not publish this great discovery until 1819. Neither could Benjamin have had a clinical thermometer for the "Medical Reports" of James Currie of Liverpool, describing the use of thermometers in medicine, did not appear until 1798†, four years after Benjamin's death. Moreover, the clinical thermometer did not come into general use until after Wunderlich's treatise appeared in 1868†.

Unless my memory plays me false, Dr. Frederick C. Shattuck told me years ago that the clinical thermometer was first used at the Massachusetts General Hospital by Benjamin Shattuck's grandson, George Cheyne Shattuck the younger. The thermometer which he used was shaped like a fish-hook. The short arm was placed in the axilla and the temperature was read on the longer, projecting arm.

Quoting again from the old "Memoir": "For twenty-four years Dr. Shattuck continued his labours in the County of Worcester and the neighboring Counties until his strength sunk under his efforts" . . . "He died of a pulmonary complaint in the year 1794. His mind continued bright and active until the last moments of his life. He reasoned and judged upon his own case with the calmness of one not interested in the event, and named to his medical friends with prescient accuracy the number of hours the mortal machine would, by the common course of Nature, continue its functions." . . . "Those who lived with him, and were the best judges of his talents and acquirements

*Mumford: page 102.

†Appendix III.

‡Mrs. Shattuck survived her husband and, subsequently, married the Reverend Asoph Rice of Westminster.

*Collections of the Massachusetts Historical Society for the year 1792. Vol. I: page 112. Published in 1806 by Timothy Paine et al.

†Fielding H. Garrison, M.D.: 1914. "An Introduction to the History of Medicine." Phila. and London.

uniformly agree that no physician of that time was more acute in discovering the seat and causes of a disease than Dr. Shattuck. To quick discernment was added a patience of investigation of all the circumstances relating to the subject under consideration which naturally led to correct views and happy results.

"His knowledge was considerable, but his wisdom was superior to his knowledge. He knew much of the thoughts of other men, but was governed by a system formed from his own. He hailed with delight the works of Cullen and other distinguished lights in his profession, but received their opinions as intellectual food, for digestion, rather than absolute guides of his own practice. He was systematic in his course of examining, reasoning, judging, and acting, but was not, like many, wedded to systems." . . . "He was often consulted by his professional bretheren in stubborn cases, and his judgment was considered by them as the '*ultima ratio medici*' . . . "There were several physicians . . . highly respectable in their day and generation, who were on most friendly terms with him, and years after he was gone, bore testimony to the soundness of his judgment and the success of his practice. Drs. Foxcroft, Atherton and Frink were among the number; all men of distinction in their profession."

At Benjamin Shattuck's funeral, a eulogy was delivered by the Reverend Ebenezer Sparhawk and, on the death of Benjamin's wife in 1821 (then Mrs. Rice), a sermon was preached by the Reverend Charles Wellington. The eulogy and the sermon were printed for private distribution and were bound together at the request of George Cheyne Shattuck the elder, but little can be found in them about the life of Benjamin or that of his wife.

Such is the simple story of Benjamin Shattuck of Templeton, medical practitioner.

APPENDIX I

Physicians Closely Related to Benjamin Shattuck

Direct Line of Descent	*Collateral Lines*
William Shattuck, 1621 or 1622-1672	
William Shattuck, 1653-1732	Philip Shattuck, *physician*, 1648-1722
Rev. Benjamin Shattuck, 1687-1763	Joseph Shattuck, *physician*, 1687-1729
Stephen Shattuck, 1710-1801	Benjamin Shattuck, *physician*, 1713-1790
Benjamin Shattuck, *physician*, 1742-1794	
George Cheyne Shattuck, *M.D.*, 1783-1854	
George Cheyne Shattuck, *M.D.*, 1813-1893	
Frederick Cheever Shattuck, *M.D.*, 1847-1929	George Brune Shattuck, *M.D.*, 1844-1923
George Cheever Shattuck, *M.D.*, 1879-	

APPENDIX II

Original Sources of Information About Benjamin Shattuck

(1) "Discourse delivered January 18, 1794, at the Interment of Benjamin Shattuck, Esq., an Eminent Physician of Templeton."

By Ebenezer Sparhawk. Boston. 1822. E. and W. Bellamy.

(2) "Memoir of Dr. Shattuck"—Anonymous and undated but published, probably, early in the 19th Century.

(3) "Memorials of the Descendants of William Shattuck."

By Lemuel Shattuck, Boston. 1855. Dutton and Wentworth. Printed for the Family.

(4) "American Medical Biography." 2 volumes.

By James Thacher, M.D. 1828. Richardson & Lord and Cottons & Barnard.

(5) Registry of Probate. Worcester County, Massachusetts.

No. 53003 re Administration of an Estate.
No. 53004 re Guardianship.

APPENDIX III

Some Books by George Cheyne, M.D., F.R.S., Which May Have Been Favorites of Benjamin Shattuck

(1) "An Essay of Health and Long Life." London. 1724.

(2) "The English Malady: or a Treatise of Nervous Diseases of all Kinds, as Spleen, Vapours, Lowness of Spirits Hypochondriacal, and Hysterical Distempers, etc."

In Three Parts. London. 1733.

(3) "An Essay on Regimen. Together with Five Discourses, Medical, Moral, and Philosophical: serving to illustrate the Principles and Theory of Philosophical Medicin, and point out some of its Moral Consequences.

London. 1740.

(4) "The Natural Method of Cureing the Diseases of the Body, and the Disorders of the Mind depending on the Body."

In Three Parts. London. 1742.

DOES MODIFIED MEASLES CONFER LASTING IMMUNITY?

BY JAMES H. TOWNSEND, M.D.*

SINCE the adoption of various methods for modifying measles by the use of immune blood, convalescent serum, or placental extract, the question has been raised whether the disease, so attenuated, would confer an immunity of long duration. If it were shown that an appreciable number of persons having the modified disease later developed it again within a few years, this would constitute a valid objection to the widespread use of this treatment.

With this question in mind a follow-up was made of a group of individuals who experienced modified measles approximately ten years ago.

In a boarding school epidemic of sixty-five cases of measles in February 1926, thirty-two individuals received 9 cc. of convalescent whole blood at least eight days before the development of the rash and experienced distinctly milder symptoms than their confreres who were not so treated. The differences in maximum temperature, duration of febrile period, occurrence of complications, and character of rash were described at that time.[1]

Replies have recently been received from all thirty-two of these individuals who were considered to have had modified measles ten years ago. In no case have any of them experienced a subsequent attack of measles. Nine individuals indicated in their replies that they had, to their knowledge, come into intimate contact with the disease, some of them several times. Five others stated that they had been present in communities while measles epidemics had been in progress, but did not know of direct contact. The others made no observations about possible exposures, but most of them were in school or college for about six out of the ten years, and probably had ample opportunity for exposure.

Conclusion: Replies from thirty-two individuals who had modified measles ten years ago indicate that none of them have experienced a subsequent attack of measles although many of them are known to have been amply exposed. There is no evidence to date that the active immunity conferred by modified measles is any less satisfactory than that conferred by the unmodified disease.

*Townsend, James H. — Assistant Physician, Massachusetts General Hospital. For record and address of author see "This Week's Issue," page 742.

REFERENCE

1. Townsend, James H.: Measles prophylaxis. The use of blood from convalescents in a school epidemic. New Eng. J. Med. **194**: 869 (May 13) 1926.

ERADICATION OF TUBERCULOSIS

With improved measures of control which are within the limits of practicability, including better detection and isolation of open cases, with higher standards of living and personal hygiene, there appears to be no fundamental reason why tuberculosis may not be virtually eradicated from large areas in this country. While there are certain contingencies which obviously might bring about a recrudescence after the disease has reached an extremely low level, it does not appear that this result is inevitable in accordance with any accepted biological law or that it is especially to be anticipated.

Admitting that we cannot actually know the future of tuberculosis, it is none the less important that we should clearly define what are reasonable expectations in the light of present knowledge, since present activities in study and control necessarily are directed chiefly toward the future. If, as I believe, it is reasonable to anticipate control to the point of permanent regional suppression, the establishment of this as the objective has obvious and important implications as to the scope and intensity of control measures. It has less obvious but important implications with respect to indicated lines of investigation.—*Excerpt from an address by Wade H. Frost, Am. Rev. of Tuberc., December*, 1935.

DO YOU KNOW?

Dementia Praecox

Each year from 15,000 to 20,000 individuals fall victims to what is known as dementia praecox soon after adolescence or in the first flush of manhood or womanhood. Properly handled about 40 per cent of these can be returned to effectual life; but the other 60 per cent will go on to a disorganization of personality that will be associated sooner or later with the intellectual deterioration that will make it necessary to segregate them.

Announcement has just been made that a fund of $40,000 has been made available for a program of investigation and study of dementia praecox under the guidance of leaders of American psychiatry. The National Committee for Mental Hygiene states that the money has been given by the Ancient Accepted Scottish Rite, Northern Masonic Jurisdiction. —*Bulletin, Public Relations Bureau, New York State Medical Society.*

CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 22151

PRESENTATION OF CASE

A forty-five year old white American salesman entered complaining of pain in the right leg.

The patient had been perfectly well until about fifteen hours before entry, at which time while writing at his desk he was suddenly seized with a terrific pain in the upper portion of his chest, both anteriorly and posteriorly. The pain moved downward through the epigastrium and finally remained constant in the lower mid-abdomen. Almost immediately afterward both legs became numb and cold. The skin became blue and the slightest movement caused severe pain. He was removed at once to a hospital. About five hours after the onset the left leg became perceptibly warmer but the right remained unchanged. Two hours later he was catheterized. Examination of the urine sediment was negative. The pain in the abdomen and the entire right lower extremity remained unabated despite the administration of morphin. Eleven hours after the onset the right leg was definitely colder and more cyanotic than at the previous examination. No pulsations were palpated in the femoral artery or any of its branches. Pulsation of the arteries in the left leg was present but weaker than normal. He was transferred to this hospital shortly afterward.

Physical examination showed a well-developed and moderately obese man unable to walk and complaining of pain in the right lower extremity. The fundi showed slight nicking of the vessels. The heart was moderately enlarged to the left. The sounds were strong, regular, and there were no murmurs or thrills. The blood pressure was 190/110. The lungs were negative. The right lower abdomen was found to be slightly cooler than the left. The left leg was warm, normal in color, and showed a moderately strong dorsalis pedis pulsation. There was no palpable arterial pulsation in the right leg, and the limb was anesthetic to the hip. Its surface was cool but not cold. The toes were bluish and color was regained ten seconds after applied pressure was removed. The leg blanched rapidly upon elevation. Movement of the hip was extremely painful. Oscillometric studies showed no pulsation in the right leg. On the left side the oscillation was three points stronger than in the arm.

A catheterized specimen of urine showed total hematuria.

X-ray examination showed slight elevation of the left diaphragm. The aorta was quite tortuous but not dilated.

Directly after admission, by a transperitoneal route, a three inch thrombus was removed from the right common iliac artery. No bleeding occurred from the proximal segment of the vessel. Eight hours postoperatively the right leg was unchanged in appearance. The blood pressure was 130/60. Excretion of urine was quite scanty and the patient was catheterized. The urine continued to be bloody. A few râles were heard at the lung bases but the heart findings were unchanged. Three hours later the patient became anuric. Cyanosis and dyspnea ensued and the chest became filled with bubbling râles. He went rapidly downhill and died thirty-six hours after the onset of his illness.

DIFFERENTIAL DIAGNOSIS

DR. SOMA WEISS*: This is then an unusual and dramatic story of a middle-aged man who after enjoying good health is seized by pain and in whom thereafter, within thirty-six hours preceding his death, disturbances in several parts of the body follow in rapid succession. These disturbances at first seem somewhat bizarre and unrelated.

1. A "terrific pain" was felt in the upper portion of his chest anteriorly and posteriorly which soon moved down through the epigastrium into the lower mid-abdomen where it remained persistent.

2. Both legs became numb and cold. He was unable to walk. The skin became blue and, as I understand it, the movements of both legs caused severe pain.

3. The ischemic state of the left leg gradually improved in the course of hours so that eleven hours later fair, though weaker than normal, pulsations are observed. Oscillometric reading also revealed fair pulsations. The skin was of normal color.

4. As these improvements occurred in the circulation of the left leg, the ischemic state of the right leg progressed and no pulsation was obtained over the femoral and other arteries below Poupart's ligament. The limb became anesthetic up to the hip, and movements of the right hip were extremely painful. Tests indicated nevertheless that the ischemia was not complete and gangrene was not present.

5. The right side of the lower portion of the abdomen became slightly cooler.

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6. In spite of the fact that the urine sediment was normal two hours after the onset of the seizure, about eleven hours after onset there developed a "total hematuria".

7. The heart was somewhat enlarged. The arterial pressure was elevated. The aortic shadow was tortuous.

We have no additional laboratory tests of aid.

(May I ask, if the question is permitted, what the temperature, the heart rate and serology were at entrance to the hospital? After all, even we of the City Hospital have such information.)

DR. TRACY B. MALLORY: The pulse rate was 90, and the temperature 99° at entrance.

DR. WEISS: It is at this point of the clinical story that a clinical diagnosis had to be made. Let us try to make it. I must say I am somewhat embarrassed, for you have invited me to discuss the differential diagnosis of this case, and I cannot offer one. There is but one condition, as far as my interpretation goes, which is characterized by all manifestations presented by this patient, and that is *dissecting aneurysm* of the aorta. It would be far-fetched to suspect multiple embolism here. I realize on the other hand, that dissecting aneurysm is a rare condition, and instances of its correct diagnosis are even rarer.

But, if a man in middle age or later, as a result of hypertension and focal medial degeneration of the arch of the aorta develops a slit through the intima and media within the arch, he can have exactly the same type of pain as this patient has had. As the dissection proceeds downward toward the iliac artery, the pain will travel down into the lower abdomen, particularly if the intercostal and lumbar branches are compressed or torn off. If the dissection involves both iliac arteries, ischemia may result in both lower extremities. But why should the circulation improve in the left leg. The answer to this question is not clear, but one conjecture is that the dissection may have reruptured into the main arterial and hitherto compressed lumen. The coldness of the right lower abdomen suggests that in addition to the compression of the common iliac, compression or tearing off of right lumbar branches of the arteries was present. The total hematuria is a rather unusual feature of dissection-aneurysm. It must indicate dissection of at least one renal artery or compression of its orifice, and infarction of the kidney.

Is the fact that x-ray revealed a "tortuous but not dilated" aorta for or against dissecting aneurysm of the thoracic portion of the aorta? This, in my opinion, is neither for nor against, but entirely compatible with dissecting aneurysm. The x-ray picture of the dissecting aneurysm can vary from no change to fusiform dilatation of the descending aorta at times with a darker central and a lighter peripheral shadow, or there may be wide shadows of one or more of the large branches of the aortic arch. All these changes depend on the width and on the direction of the dissection which can be narrow and partial or wide and complete with all transitions. The tortuous picture obtained in this case indicates either that the aorta was tortuous as a result of sclerosis and the associated section was narrow or that the tortuosity was caused by the irregularity of the dissection.

Let us now examine the sequence of events after admission. Do they confirm or contradict our diagnostic impression? The patient was operated upon apparently for a suspected embolus in the right iliac artery. This is entirely compatible with a mistaken diagnosis of a dissecting aneurysm. I know of two cases in which embolectomy was performed for suspected embolus in the brachial artery, imitated by the dissected and compressed artery. In a third case "acute abdomen" was suspected but no pathology was found on exploration. Postmortem examination revealed dissection of the abdominal aorta.

The fact that after removing three inches of thrombus no bleeding occurred from above, confirms the suspicion that the acute ischemia of the right leg was caused by the dissection of the iliac artery rather than by an embolus. The anuria that followed may well have resulted not only from dissection and compression of the renal arteries but also as a result of the added factor of shock.

Death was rather sudden, associated with cyanosis, dyspnea, and pulmonary edema. This is entirely compatible, though the evidence is inadequate to call it characteristic, with cardiac tamponade, by far the most common cause of death in dissecting aneurysm.

In conclusion, to me the simplest and most obvious interpretation of the sequence of events in this case is as follows:

1. Arterial hypertension. Cardiac hypertrophy.

2. Focal degeneration of the media of the arch of the aorta. Medionecrosis aortae cystica.

3. Intimal tear within the arch invading and dissecting the media, causing thoracic pain.

4. Dissections down to and involving the iliac arteries. Possible rerupture of the dissection into the left iliac artery. Dissection and compression of the right iliac artery. Circulatory ischemia of the right leg.

5. Dissection of the renal arteries with compression and possible infarction with resulting hematuria and anuria.

6. Possible compression or tearing of the lower intercostals and lumbar arteries (right) causing pain and coolness over the right side of the abdomen.

7. Probable hemopericardium and cardiac

tamponade from the dissection rupturing into the pericardium, causing pulmonary edema, circulatory collapse and death.

DR. MALLORY: Dr. Holmes, can you add anything?

DR. GEORGE W. HOLMES: The diaphragm is obviously high on the left side. That is difficult to explain unless there was something directly below it pushing it up, or possibly paralysis of the phrenic nerve. The heart is enlarged to the left and shows a characteristic picture of hypertrophy of the left ventricle. The supracardiac shadow is increased and the aorta looks actually wide in this film. Of course this is not a film taken at seven foot distance and there is a good deal of magnification but I think one would almost be justified in saying there was slight dilatation of the aorta. It may all be due to tortuosity. There is nothing in this film that would allow me to interpret a dissecting aneurysm but I would agree that there is not evidence against it.

CLINICAL DIAGNOSES

Embolus, right iliac artery.
Ascending thrombosis of abdominal aorta.
Hypertensive and coronary heart disease.

DR. SOMA WEISS'S DIAGNOSES

Dissecting aneurysm of the abdominal aorta and medionecrosis cystica, with the complications as listed above.

ANATOMIC DIAGNOSES

Dissecting aneurysm of the thoracic and abdominal aorta and with partial dissection of the left renal and left common iliac arteries.
Medionecrosis cystica.
Cardiac hypertrophy, hypertensive type.
Infarcts of the kidney.
Pulmonary edema and congestion, bilateral.
Operative wound: removal of thrombus of right iliac artery.

DR. MALLORY: I think it is probably only fair to say that the history as Dr. Weiss had it was obtained at successive intervals and a good deal of it was not known at the time the patient was operated on. His diagnosis is entirely correct and is accurate down to many of the small details. There was a dissecting aneurysm. In most of the dissecting aneurysms that we have seen, the rupture in the intima has been a relatively short distance above the aortic valve and the dissection has run over the arch and down the remainder of the aorta. In this case the rupture in the intima was just at the apex of the arch, and the ascending aorta was not involved. The dissection carried the entire length of the aorta and extended down into the left iliac artery for a distance of six or seven centimeters where a rupture had again occurred in the intima and the stream of blood came back into the iliac artery, accounting in that way for the return of pulsation in the right leg. On the right side the dissection did not go so far. It stopped just before the bifurcation, and the aortic intima at this point was ballooned up to form a valve across the mouth of the right iliac artery, completely occluding it. The thrombus which Dr. Smithwick found was the ordinary secondary thrombosis of stagnating blood beyond a point of vascular obstruction. The dissection had involved the left renal artery, but not the right. The affected artery beyond the point of obstruction was thrombosed, and multiple irregular small infarcts were found throughout that kidney. It is a little hard to understand why with obstruction of the main renal artery one should not get total infarction of the kidney, but only the cortical part and not all of that was infarcted. There must have been a fairly extensive collateral circulation. With the point of intimal rupture as high as it was in this case, actually in the arch, with the ascending aorta uninvolved, there was no chance for rupture into the pericardium. The exact mechanism of death was not apparent.

DR. HOLMES: Was the left kidney large?

DR. MALLORY: There was no difference in the two in gross.

DR. HOLMES: Any explanation for the high position of the diaphragm?

DR. MALLORY: No.

A PHYSICIAN: What was the clinical discharge diagnosis?

DR. MALLORY: Embolus of the right iliac artery and thrombosis of the abdominal aorta.

DR. WEISS: Was there any involvement of the branches of the lumbar or intercostal arteries?

DR. MALLORY: Not so far as we could tell. In these cases, however, the layers of the aortic wall are sometimes separated several millimeters from each other. The various branches of the aorta, unless they are torn free from their intimal attachment, must traverse this space where they are subjected to external pressure from the surrounding blood, which may be of a magnitude equal to, or even greater than that within their lumina. In this way they are subject to compression which may or may not lead to obliteration and circulatory arrest. It would obviously be impossible from the anatomic findings to determine what the relative pressure relationships may have been during life.

DR. WEISS: What did histologic examination of the aorta itself show?

DR. MALLORY: The aorta in various places showed a definite though mild degree of medionecrosis cystica. It is a degree of the process that we find quite often in routine autopsies,

not so severe in fact as several that I have picked up in routine sections. Just why in this particular case rupture and dissection should have occurred is not clear. In the entire group of dissecting aneurysms that we have seen there was less abnormality of the aorta in this case than in any of the preceding ones.

A PHYSICIAN: Can it be said definitely that the phrenic arteries were not involved?

DR. MALLORY: We did not specifically investigate them.

DR. HOLMES: The dissection extended up to what we call the aortic knob?

DR. MALLORY: Yes, it began at just about that point, I should say.

DR. HAMPTON: Was it all around the aorta or just on one side?

DR. MALLORY: It ran about two-thirds of the way around. They rarely are complete.

The correct diagnosis in this case was made by Dr. Thompson, the resident in cardiology, and various other people.

CASE 22152

PRESENTATION OF CASE

First Admission. A fifty-one year old white American dining car steward was admitted complaining of pain and swelling of the right fifth toe.

The patient, a known diabetic for two years, had sharp steady pain in his right fifth toe for about a week. This had begun as a small reddened area with subsequent swelling of the toe. Later the entire foot and ankle became swollen and tender and yellowish discharge exuded from the primary area.

The patient had been treated satisfactorily for his diabetes with insulin and diet for two years. A year before a lumbar puncture showed 192 cells per cubic millimeter, all of which were lymphocytes. A Wassermann test of the spinal fluid was positive. The total protein was 60 milligrams. An x-ray taken at that time showed no enlargement of the heart or any abnormality of the lung field.

Physical examination showed an elderly man lying flat in bed coughing occasionally. The skin and mucous membranes were pale. The left pupil was irregular but both pupils reacted to light. The heart was not enlarged. A coarse blowing systolic murmur was audible at the aortic area and was transmitted into the vessels of the neck. A_2 was clear and sharp. The blood pressure was 188/80. There was a slight increase of tactile fremitus and coarsening of the breath sounds at the right base, where a few coarse râles were audible. All the pedal arteries showed normal pulsation. A local area of necrosis with a foul-smelling discharge was observed upon the right foot. The entire foot was reddened, edematous, and tender. The reflexes were all normal.

The temperature was 102.5°, the pulse 100. The respirations were 20.

Examination of the urine was entirely negative. The blood showed a white cell count of 19,300.

On the day following admission the right fifth toe was amputated. His temperature continued to show daily rises to 100° or 101°. He continued in good condition for about a month and a half except for small sloughs arising in the region of his operative wound. At this time routine examination showed bile in his urine. He became rapidly jaundiced and had an icteric index of 25. Both the liver and spleen became palpable but he complained of no discomfort. The stools persistently contained bile. About ten days later the jaundice, which had been slowly progressive, subsided slightly and a guillotine amputation of the right lower leg was done. The jaundice deepened thereafter and a liver function test showed 100 per cent retention. The icteric index was 80. Four weeks after its onset the icterus again began to subside. Skin grafts were applied to the stump of the leg. Three months after admission the patient developed herpes zoster of the right flank. At the end of ten days this had completely subsided, as had the jaundice. He was discharged three and a half months after entry with his diabetes well controlled.

Second Admission, two and a half years later.

The patient had been treated during the interval with several courses of tryparsamide, but both spinal fluid and blood Wassermann tests had remained positive. His diabetes was well controlled by diet alone. The stump of the leg had healed well. He had worked for a year preceding his reëntry. Two days before his return he injured the small toe of his left foot. This became swollen, red, and tender.

Physical examination showed the patient to be well nourished. A few transient râles were audible at both bases. The heart was not enlarged and the murmur heard previously was still present, and in addition a diastolic murmur was now heard in the aortic area. The blood pressure was 190/80. There was a slightly infected ulcer on the left fifth toe.

The temperature was 100°, the pulse 100. The respirations were 25.

Examination of the urine showed a specific gravity of 1.025, a trace of albumin, and a green precipitate with the Benedict test. The sediment was negative. The blood showed a white cell count of 5,400, and a hemoglobin of 90 per cent. The nonprotein nitrogen of the blood was 32. Hinton and Wassermann tests were positive.

X-ray examination showed slight increase in the transverse diameter of the heart, with a pressure defect in the region of the left auricle. The aortic knob appeared to be at the upper

limit of normal. The fluoroscope showed vigorous pulsation of the ventricle and aorta.

On the second day the patient developed a generalized urticaria, which was relieved by adrenalin. At the end of the first week the left fifth toe was amputated. The patient responded well and was discharged afebrile two weeks later.

Final Admission, seven months later.

A week before reëntry, after a picnic, the patient was awakened during the night by severe pain in the anterior portion of the chest. Its location was vaguely recorded. This was followed by severe rigor. The pain continued undiminished up to admission. A few days after the onset he developed an unproductive cough which was hacking in character. Both the cough and deep inspiration aggravated the pain, which later became worse in the region of the lower sternum and precordium. There was no radiation. Since the onset of his illness he suffered a severe chill each day. At one time his temperature was 104°.

Physical examination showed the presence of a pale lavender cyanosis. The patient appeared to be mildly prostrated. The skin was cold and clammy. The pulse was thready, with a rate of 120. The heart appeared slightly enlarged to the left. The sounds were of very poor quality. No murmurs were audible. A_2 was greater than P_2. The blood pressure was 85/55. At the left lung base from the angle of the scapula down there were bronchovesicular breath sounds of diminished intensity accompanied by many crackling râles. The abdomen was distended, tympanitic, and slightly tender. There was a small gangrenous area on the left second toe.

The temperature was 102°; the respirations were 32.

Examination of the urine showed a trace of albumin. The sediment contained a few coarsely granular casts. The blood showed a red cell count of 3,400,000, with a hemoglobin of 65 per cent. The white cell count was 13,000, 78 per cent polymorphonuclears. The stools gave a positive reaction to the guaiac test. The chlorides were equivalent to 87 cubic centimeters of N/10 sodium chloride. The nonprotein nitrogen of the blood was 97.

X-ray examination showed what appeared to be dilatation of the heart in the region of the left ventricle. The aorta was tortuous and slightly dilated. The left lung field was dull and showed hazy outlines.

The patient became quite toxic, weak, and eventually semicomatose. No acetone appeared in the urine. He began to vomit, went rapidly downhill, and died on the third hospital day, three and a half years after the first admission.

Differential Diagnosis

Dr. Robert S. Palmer: Summarizing the first admission, we have here a patient who had known diabetes and known central nervous system lues. He came in with a septic toe and on examination had a normal cardiovascular system except for a very wide pulse pressure. It was significant that no aortic diastolic murmur was heard. He also had a few râles at one base. There was a moderately elevated temperature, 102°; the pulse was only 100; I do not think he had real congestive failure. The only unusual thing in the course of this admission was that he had two attacks of jaundice, one a rather long one, and no particular details are given except that it was of gradual onset and it gradually passed off. He was operated on a second time and had a recurrence of jaundice. It might be the jaundice one occasionally gets with congestive failure. I wonder if with syphilis and diabetes he did not have a so-called low reserve liver. The x-rays showed a heart of normal size and shape. We know he had central nervous syphilis. We know he had large vessel sclerosis which would explain his wide pulse pressure. Syphilis of the liver may have been present. The record does not state that he was under antiluetic treatment, which could have given toxic jaundice.

He came in a second time two and a half years later. He had been under treatment with tryparsamide. His diabetes was apparently well controlled and the stump of the leg had remained all right, but now he came in a second time with more diabetic gangrene. The heart was not enlarged. Again he had wide pulse pressure and this time an aortic diastolic murmur was heard in addition to a systolic murmur. Only the latter had been heard before. There was nothing unusual in the laboratory examination except that the Hinton and Wassermann tests still remained positive. The x-ray examination showed slight increase in the transverse diameter of the heart with pressure defect in the region of the left auricle. The aortic knob appeared to be at the upper limit of normal. Fluoroscopic study showed vigorous pulsation of the ventricle and aorta. That would be against there being any particular failure at the time and would be consistent with a developing regurgitation which we assume is syphilitic in origin. Of great interest is the pressure defect in the region of the left auricle. What we want to know is, was it pulsating and in the oblique position was it seen to be coming from the aorta, possibly, or was it a mediastinal tumor?

X-ray Interpretation

Dr. George W. Holmes: We have one film of the gallbladder region. Apparently the patient was not given the Graham test. He has no calcified gallstones.

We have a series of films of the lower legs and feet requested I presume to show calcification in the arteries, if present; and they do show some calcification. The most interesting part of the examination is the

chest. This is one of the earlier films taken in 1932. That film was taken with the tube in front and the film behind, which accounts for the widening of the heart shadow and the great vessels. This is a film taken at seven foot distance and it gives a much more accurate idea of the heart. His diaphragm, you will notice, is high on both sides. This is a gas bubble which is causing the high position of the left diaphragm. That probably has something to do with the increase in width of the heart shadow, but I think it would be fair to say that the heart was somewhat enlarged and that the aorta was tortuous without evidence of dilatation. In this oblique view you get a fairly good idea of the distance between the esophagus and the anterior wall of the aorta which allows us to estimate the diameter of the aorta in the region of the arch and it certainly is not much dilated. I do not see sufficient evidence in these films to justify a diagnosis of luetic aortitis.

DR. PALMER: It does not look particularly tortuous or sclerotic.

DR. HOLMES: He was fifty-one. There is a little more prominence of the knob than a man of fifty-one should have.

DR. PALMER: There is a notch in the region of the left auricle.

DR. HOLMES: There is no definite evidence here. But I do think the auricle encroaches on the mediastinum more than it should. What evidence I have is simply enlargement of the left auricle. He has at this time, at least, no dilatation of the vessels in the region of the heart. This is a plate taken in 1935 and here again nothing definite is found so far as the heart is concerned.

DIFFERENTIAL DIAGNOSIS CONTINUED

DR. PALMER: So about three years after his first admission he came in for his final admission. From his previous admissions, noting his diabetes, noting his syphilis and noting that he had aortic regurgitation of syphilitic origin, he has two of the things that are prone to lead to aneurysm, or to defect in the first portion of the aorta, and either of which may lead to rupture of the aorta. These are two possibilities. I think it is unusual for a person to have chills every day, and rigors, with a temperature as high as 104° if he had rupture of the aorta into the pericardium or rupture of an aneurysm.

The thing that I would like to know most and the thing that would be most important in making a differential diagnosis in this case is not mentioned; namely, the condition of his neck veins. Any patient who is cyanotic, has a sudden marked fall in blood pressure, has very weak heart sounds and disappearance of murmurs previously heard, *if he does have engorged neck veins,* one can certainly say is suffering from acute cardiac compression. In cases of aortic rupture into the pericardium one sees very high venous pressures and there ought to be no doubt about the condition of the neck veins. If he did not have engorged neck veins and a high venous pressure, and particularly in view of the fact that he has had chills, rigor and high temperature every day, you would think of a different process, a septic affair, possibly involving the chest, although I do not see how it would explain the sharp, severe or continued pain. So we must think of metastatic sepsis from the focus on his foot. Another possibility is that from the sepsis in the foot he had phlebitis and he might have had a large pulmonary embolus. This might explain the fever and the chills, presumably might have given an x-ray picture which we will hear about, but I do not think the distribution and type of pain are just right.

I think the last two findings in the history are consistent with infection. I think perhaps the blood findings would go with either possibility.

If his heart area is much increased it would be in favor of possible rupture into the pericardium. The other thing is, you wonder if he could have pulmonary embolism, and acute cor pulmonale. I take it he did not have any pulmonary collapse on that side or his heart would be pulled over.

DR. HOLMES: One other possibility I think you should consider is fluid in the pericardium from rupture.

DR. PALMER: Yes; I said that blood in the pericardium would give the picture.

The urine examination makes us sure he did not die of diabetic coma anyway.

From the first two admissions we know that he had syphilis and diabetes and we know that he had marked sclerosis, presumably of the large vessels, even if it does not show up particularly in the aorta. In the last admission we have a history of sudden onset of severe vaguely localized upper precordial and lower sternal pain and we find a person who is cyanotic with faint heart sounds, murmurs previously well heard which disappear, a rapid pulse, plus pain, plus fall in blood pressure; and we would like to know whether or not he had a markedly raised venous pressure which is characteristic of acute cardiac compression. It seems to me, though I am not certain of this, that it is not characteristic for a person to have chills and rigors for three days from blood in the pericardium. Now if he has blood in his pericardium and it is acute cardiac compression, it can come from rupture of the aorta which might be due to sclerosis, syphilis, or congenital defect. Coronary arteries can rupture, the auricle can rupture. Those are the usual ones that give this hemopericardium. I think, as I have said, that the temperature and rigor are against its being due to blood in the pericardium.

Could it be due to septic pericarditis? Usually it is a complication of pneumonia or mediastinitis or something else you would know about, and whether such a thing could happen in this person from his septic foot, I do not know. I think it is a possible cause of the septic sort of temperature. It seems unlikely and I do not think this possibility would fit the severe and continued pain he had in the last three days of his illness. There is nothing in the x-ray to indicate that it was due to any other compression. One can get cardiac compression from pulmonary rupture and pneumothorax. Even rare things have been reported, such as gas bacillus infection involving the mediastinum. I will say that he had general arteriosclerosis, syphilitic heart disease, and will show evidence of aortitis even though dilatation does not show up by x-ray. He had aortic regurgitation and I think that he died of acute cardiac compression and that probably it is due to rupture of the aorta with blood in the pericardium, hemopericardium. Where the rupture is from, I do not know. It might be from the base of the aorta, from an aortic aneurysm in the first portion, or from the auricle.

I suppose one has to consider the possibility of acute coronary thrombosis and a rupture of the ventricle but I do not see any reason to ask for that in addition when you already have the possibility on the basis of lues.

A Physician: Does "pale lavender cyanosis" mean anything or is it just another descriptive term for cyanosis? I was wondering about the blood.

Dr. Tracy B. Mallory: I should imagine it was just a combination of cyanosis and pallor as indicated.

Clinical Diagnoses

Diabetes.
Central nervous system lues.
Arteriosclerotic heart disease.
Amputation of right lower leg and left fifth toe.
Bronchopneumonia.
Uremia.

Dr. Robert S. Palmer's Diagnoses

Diabetes.
Arteriosclerosis.
Syphilitic heart disease.
Syphilitic aortitis.
Syphilitic aortic regurgitation.
Rupture of aorta into pericardium.
Cardiac compression, the cause of death.

Anatomic Diagnoses

Pericarditis, acute fibrinopurulent.
Aortitis, syphilitic.
Coronary thrombosis with occlusion and without infarction, old.
Cardiac hypertrophy, slight, hypertensive type.
Septic infarcts of the lung, bilateral.
Bronchitis, acute purulent.
Hydrothorax, bilateral.
Pulmonary edema and congestion.
Pyelonephritis, left.
Hydroureter, left.
Cystitis, chronic.
Hyperplasia of prostate, obstructing.
Esophageal varices.
Meckel's diverticulum.
Arteriosclerosis, marked aortic.
Operative wounds, old: amputation of right lower leg; amputation of left fifth toe.
(Diabetes.)
(Syphilis.)
Septic spleen.

Pathologic Discussion

Dr. Mallory: This man was quite a museum of pathology. Most of the things that he had Dr. Palmer has already suggested and I think he was quite correct in his belief that the man died of acute cardiac tamponade. It was not, however, due to blood in the pericardium, but to acute purulent pericarditis. He had generalized sepsis with multiple septic infarcts in the lungs, an acute pyelonephritis and this extensive acute pericarditis. He did have a typical luetic lesion of the aortic valve and a moderate degree of dilatation in the first portion of the aorta, just above the valve, with typical scarring and wrinkling which we can feel sure was due to syphilis. His left descending coronary was completely obliterated by atheroma but there was no infarction. A few of the various other findings were a hydroureter, a hyperplastic prostate, esophageal varices for which we could find no cause, and a Meckel's diverticulum, though these by no means exhaust the list. The liver, gallbladder and bile ducts were all negative.

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THE CHALLENGE OF THE GONOCOCCUS

THE decrease in typhoid fever, diphtheria and tuberculosis is a matter of common knowledge and gives us just cause for pride in the accomplishments of the various services that care for the public health. The incidence of gonorrhea, on the contrary, appears to have decreased little if at all. Studies by Usilton show that in the United States there are approximately 493,000 individuals constantly under treatment or observation for gonorrhea; the number of fresh infections occurring annually is 8 per 1000, which means that approximately one million cases occur each year in the whole country.

It is difficult to believe that this situation should exist without determined effort being made to find a solution. The problem presents two possible points of attack: first, the prevention of infection and secondly, the rapid cure of those infected.

The first phase—that of prevention—is one of the chief objectives of such organizations as the American Social Hygiene Association and the Massachusetts Social Hygiene Association. These societies endeavor, by means of education, to limit the number of possible exposures to infection. It has seemed to their directors unwise to attack the problem by advocating individual venereal prophylaxis.

No such scruple existed for the New York *Daily News*. This paper, stimulated by a statement made by the Health Commissioner of New York City to the effect that the prevention and treatment of syphilis was the gravest single problem facing his department, launched a campaign to give the public full and free knowledge of venereal prophylaxis. The *News* published a series of articles on gonorrhea and syphilis, how to cure them and where free treatment might be obtained; these articles were reprinted, bound in a pamphlet entitled "Venereal Diseases and Prophylaxis", and placed on sale at five cents a copy. This action of the *Daily News* should be welcomed by those engaged in the fight against gonorrhea and syphilis, for it is generally believed that once this problem is driven out of its entrenched secrecy and into the open, it can be attacked with much greater probability of success.

The second point of attack has to do with the rapid cure of gonococcus infections. Rapid cure is most essential, both to reduce the enormous economic loss incident to the disease and to prevent the infection of others, since such infection is caused largely by patients who believe themselves cured or whose infection is in a subacute stage. Yet in spite of the urgent need for improvement in the treatment of this disease, our methods are essentially the same as they have been for the past twenty years.

Not until the past five or at most ten years has there been any attempt on the part of more than an occasional bacteriologist to discover certain fundamental facts about gonococcus infections. Without knowledge of these facts, which have to do with the immunity of the host, the resistance of the gonococcus to heat, and various other aspects of the problem, a rational, aggressive therapy cannot be defined.

It is encouraging to learn that at last the light of scientific research is being focussed upon this field. In 1932 the Division of Medical Sciences of the National Research Council voted favorably upon a proposal of Doctor Keyes, President of the American Social Hygiene Association, that a coöperative project be undertaken with the object of promoting the study of the gonococcus and gonococcal infections. In January, 1936 the Committee appointed for this purpose, with Doctor S. Bayne-Jones as Chairman, published its first report.*

*Supplement to the *American Journal of Syphilis, Gonorrhoea, and Venereal Diseases*. Vol. 20, No. 1.

In this report is summarized all the important work done on this subject within the past five years, as well as certain outstanding work done previous to that period. The report is divided into two principal sections: (1) the biology of the gonococcus, including morphology, staining reactions, methods of culture, chemistry, and its resistance to physical and chemical agents; (2) gonococcal infections, including types and modes of infection, pathology, diagnosis and therapy. Material of the greatest value in laying a foundation for future research has been collected, yet in reading this compilation, one is impressed by the gaps still existing in our knowledge of the subject. Many encouraging leads have been opened, but we still do not know why gonococcus infections clear up, nor has any really valuable measure been discovered whereby we can hasten their cure. At the present writing, the methods which have been employed for the past thirty years are the ones upon which we must rely in treating the vast majority of gonococcus infections.

We do not believe that this problem, any more than the problem of cancer, will forever resist the investigations of scientific research. The time will surely come when gonorrhea, with its attendant tragedies and economic waste, will yield to a specific therapy as completely as diphtheria responds today.

THE USE OF DUST RESPIRATORS IN INDUSTRY

At the annual meeting of the American Society of Mechanical Engineers, four papers* featuring the prevention of industrial diseases were presented. One of the papers by Professor Philip Drinker of the Harvard School of Public Health dealt with the uses and limitations of respiratory protective equipment. Drinker described and illustrated self-contained oxygen breathing equipment, masks supplied with fresh air, gas masks, and dust respirators. The important work of the United States Bureau of Mines in developing codes for testing and certifying the performance of these various devices was stressed and industry was urged to take advantage of the Bureau's service.

It has been claimed, as the result of an incomplete press release, that Drinker condemned the use of dust respirators in industry. He did no such thing. Like others, whose chief interest is in industrial hygiene, he emphasized that respiratory protective equipment, and particularly dust respirators, are not a substitute for clean air. There are hundreds of jobs to which respirators are well adapted—they should not be condemned as they are much too useful, but they are not a substitute for clean work places. They are a second line of defence, and as such, they are used throughout the industrial world.

*Published in full in the February and March numbers of *Mechanical Engineering*, 29 West 39th Street, New York, New York.

THE BOSTON HEALTH LEAGUE

Annual Meeting

The Boston Health League, on Wednesday, March 11, held its annual dinner and meeting at the Hotel Vendome. Miss Margaret H. Tracy, the executive secretary of the League, reported on its activities for the year 1935, and other important events that have had a bearing on health, such as the formation of the Community Federation and the Hospital Council, and the organization and work of the Massachusetts State Health Commission. In addition to the regular monthly meetings of the Executive Committee, the various sub-committees have held numerous special meetings.

Seven talks to lay groups have been given by the Cancer Committee, and a study has been made of one hundred consecutive admissions in each of the eight cancer clinics. The Health Education Committee has sponsored a series of food exhibits demonstrating elementary principles of nutrition, the Pneumonia Committee has continued to publicize the State's pneumonia service, and the Social Hygiene Committee, with the Boston Council of Social Agencies, has sponsored the monthly meetings of the Staff Council on Syphilis and Gonorrhea. The Summer Camp Committee has again issued a pamphlet in order that leaders and others responsible for children in summer camps may have available a guide for measuring, to some extent, equipment and standards.

Dr. William B. Keeler was introduced as Boston's new Health Commissioner, and announced the following Advisory Council to the Health Department:

Dr. John W. Bartol
Professor Alexander S. Begg
Professor Samuel Prescott
Dr. Roger I. Lee
Rev. Richard J. Quinlan
Professor Wilson G. Smillie
Dr. George C. Shattuck
Dr. Hyman Morrison
Mr. Horace Morison
Miss Gertrude Peabody

Dr. Reginald M. Atwater, Executive Secretary of the American Public Health Association, spoke on "Team Work in Public Health."

The following officers were elected for the coming year:

Honorary President Dr. William B. Keeler
President . . . . Dr. John W. Bartol

Vice-President . .	Rev. Robert P. Barry
Treasurer	Dr. Richard G. Wadsworth
Secretary	Dr. Charles F. Wilinsky

EXECUTIVE COMMITTEE

Dr. Gaylord W. Anderson
Miss Ida M. Cannon
Mrs. Frederick S. Dellenbaugh, Jr.
Dr. James M. Keenan
Mr. Horace Morison
Mr. Arthur G. Rotch
Dr. Ben M. Selekman
Dr. George C. Shattuck
Dr. Wilson G. Smillie
Dr. Richard M. Smith
Mr. Frank E. Wing

TREASURER'S REPORT—JANUARY 1, 1935 TO DECEMBER 31, 1935

INCOME			
Subscriptions and Donations			$5,350.30
EXPENSE			
Rent		$ 664.20	
Salaries		3,689.22	
Postage, Printing, Office Supplies		287.60	
Telephone		233.00	
Miscellaneous Expenses:			
Contribution to Boston Council of Social Agencies	$25.00		
Society Dues	12.00		
Travel	80.00		
Reprints	38.66		
Repairs	35.00		
Sundries	28.68	219.34	
		$5093.36	$5,350.30
*BALANCE Jan. 1, 1935			2,028.35
*BALANCE Dec. 31, 1935		2,285.29	
		$7,378.65	$7,378.65

*The balance at the beginning of the year and that at the end appear very favorable because in December, 1934, and again in December, 1935, the Health League received a special donation of $1,500 to carry the work of the organization for the first three months of the next calendar year.

The Massachusetts Medical Society

THE ANNUAL MEETING

"Are you planning to go to the Springfield meeting of the Society June 8, 9 and 10?"

"Too far."

"I haven't time."

"Well, I haven't thought about it."

"No, I'm sick of medical meetings, they're all the same."

How easy it is to rationalize our laziness and indifference. If the Annual Meeting served no other purpose it would still be worth while just because this annual question reminds us that our obligations extend beyond the little daily world of our own practice or our own hospital. And surely not one of us would question that they do! If all interchange of medical knowledge and thought were suspended tomorrow, how quickly medical progress would stop!

But that is considering our professional obligations in their broadest sense. They may be brought much nearer home than that. To our own patients and colleagues we owe the refreshed enthusiasm and new ideas awaiting us in the section meetings, exhibits, entertainments, chance encounters, and change of scene which together make up the Annual Meeting of the Society.

"Yes, I most certainly am going to Springfield June 8, 9 and 10!"

BOSTON MEDICAL LIBRARY

INAUGURATES NEW SERVICE

THE Library has made special arrangements to display for its members the important new medical books as issued by all American publishers. The books will be constantly changing as new books are received and will be kept on exhibit for thirty days in the Director's office on the first floor of the Library.

They may be examined on application to the Director's Secretary.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

AYCOCK, W. LLOYD. M.D. University of Louisville Medical School, Kentucky 1914. Assistant Professor of Preventive Medicine and Hygiene, Harvard University Medical School. Director of Research, Harvard Infantile Paralysis Commission. Address: Harvard University Medical School, Boston, Mass. Associated with him is

HUDSON, C. C. M.D. University College of Medicine, Richmond, Va. 1910. Health Officer, City of Greensboro, North Carolina. Address: Health Department, Greensboro, N. C. Their subject is The Development of Neutralizing Substance for Poliomyelitis Virus in Vaccinated and Unvaccinated Individuals. Page 715.

WHITE, PAUL D. A.B., M.D. Harvard University Medical School 1911. Physician, Massachusetts General Hospital. Assistant Profes-

sor of Medicine, Harvard University Medical School. His subject is A Note on the Common Occurrence of Serious Involvement of the Heart in Hyperpiesia. Page 719. Address: Massachusetts General Hospital, Boston, Mass.

DRESSER, RICHARD. Ph.B., M.D. Johns Hopkins University School of Medicine 1921. Roentgenologist, Collis P. Huntington Memorial Hospital and Pondville Hospital at Norfolk. Visiting Roentgenologist, Massachusetts General Hospital. Address: 695 Huntington Avenue, Boston, Mass. Associated with him is

PELLETIER, VALMORE A. A.B., M.D. Harvard University Medical School 1926. Surgeon to Out-Patients, Pondville Hospital, Wrentham, Mass. Member of Associate Staff, Norwood Hospital. Address: 38 Cottage Street, Norwood, Mass. Their subject is The Radiological Management of Cancer of the Breast. Page 720.

CLUTE, HOWARD M. B.Sc., M.D. Dartmouth Medical School 1914. F.A.C.S. Professor of Surgery, Boston University School of Medicine. Surgeon-in-Chief, Massachusetts Memorial Hospitals. Surgeon, New England Deaconess and New England Baptist Hospitals. His subject is Duodenal Stump Closure in Gastric Resections with a Modified Furniss Clamp. Page 724. Address: 171 Bay State Road, Boston, Mass.

SMITH, GEORGE VAN S. A.B., M.D. Harvard University Medical School 1926. F.A.C.S. Assistant Visiting Surgeon, Pathologist, and Director of Research, Free Hospital for Women, Brookline, Mass. Research Fellow in Gynecology, Harvard University Medical School. His subject is Recrudescence of Ovarian Function After Heavy Irradiation. Two Cases. Page 725. Address: Free Hospital for Women, Pond Avenue, Brookline, Mass.

SHATTUCK, GEORGE CHEEVER. M.D. Harvard University Medical School 1905. Assistant Professor of Tropical Medicine, Harvard University Medical School. Assistant Visiting Physician, and Physician in Charge of Service for Tropical Diseases, Boston City Hospital. Consultant in Tropical Diseases, Massachusetts General Hospital and United States Marine Hospital No. 2, Chelsea, Mass. His subject is Benjamin Shattuck of Templeton—Medical Practitioner. Page 727. Address: Harvard University Medical School, Boston, Mass.

TOWNSEND, JAMES H. A.B., M.D. Harvard University Medical School 1921. Assistant Physician, Massachusetts General Hospital. Instructor in Medicine, Harvard University Medical Schoool. His subject is: Does Modified Measles Confer Lasting Immunity? Page 732. Address: 319 Longwood Avenue, Boston, Mass.

The Massachusetts Medical Society

SECTION OF OBSTETRICS AND GYNECOLOGY*

C. J. KICKHAM, M.D., *Chairman*, 524 Commonwealth Ave., Boston, Mass.
R. S. TITUS, M.D., *Secretary*, 472 Commonwealth Ave., Boston, Mass.

POSTPARTUM HEMORRHAGE

PART 1

Hemorrhage that occurs after the birth of the baby, regardless of whether the placenta has been delivered, is postpartum hemorrhage. The amount of bleeding may be a prolonged trickle, the total amount ultimately reaching that point where life is threatened. Other times the bleeding is tremendous in volume, almost as though one had turned on a large faucet. There is nothing so upsetting, there is nothing so fearsome as serious blood loss, particularly as it oftentimes occurs after the baby and placenta have been delivered and everything seems favorable.

The causes of postpartum hemorrhage are as follows:

1. Lacerations.
2. The rupture of varicose veins.
3. Atony of the uterus.
4. Conditions associated with the placenta.

The proper treatment of postpartum hemorrhage, of course, depends upon an intelligent diagnosis. Postpartum hemorrhage from lacerations occurs as soon as the baby is born and of course has no relation to whether the placenta has separated. In the old days when accouchement forcé was an operation of daily occurrence postpartum hemorrhage from a badly torn cervix was a very common thing. Nowadays, when that operation has been intelligently cast into the discard, postpartum hemorrhage from a laceration of the cervix is a very uncommon episode. A badly scarred cervix may suffer a very deep tear in normal or operative delivery, particularly in versions, when a cervix without scar would not tear so badly.

The diagnosis of a torn cervix is made by inspection. Its treatment is ligature. When a cervix has been torn badly up into the vault one must always remember the possibility of an incomplete rupture of the uterus. This, if diagnosed, means laparotomy, with or without hysterectomy, depending upon conditions found when the abdomen is opened. The other common site of lacerations which cause too free

*A series of short selected articles by members of the Section is being published weekly.
Comments and questions by subscribers are solicited and will be discussed by members of the Section.

bleeding are vessels lacerated anteriorly near the clitoris or posteriorly in the perineum. These should readily be diagnosed by sight and are always easily controlled by ligature.

It is always well to remember that big veins may rupture during labor or at delivery. If they are large enough they cause the loss of a tremendous amount of blood, but these again should rarely prove serious because they can readily be seen and a ligature properly placed will always control the bleeding.

Atony of the uterus means simply that the uterus has lost its normal tone; when following the birth of the placenta the periods of uterine relaxation are much longer than the periods of uterine contraction. The perfectly normal uterus, after the birth of the placenta stays firm almost all the time, relaxing very little and staying relaxed only a short time between much longer periods of contraction. An atonic uterus is oftentimes associated with precipitate labors, with cases of twins or hydramnios, where the uterine musculature has been unduly stretched, and with long, drawn-out labors, and in cases where the third stage has been poorly handled.

No attempt ever should be made to credé a placenta until there have been evidences of separation, such as the descent of the cord and moderate spasmodic bleeding. Of course it is folly to allow a placenta to remain in the uterus after it has separated. On the other hand, one should never attempt to credé it until one is certain separation has occurred. Provided one has had evidence of separation, that is, descent of the cord or spasmodic loss of blood associated with contractions, one is justified in attempting to credé the uterus. If the placenta has not separated entirely too rigorous attempt at credé oftentimes results in more separation, without complete separation, and much more bleeding. If the placenta does not readily come and the uterus is behaving itself, without any undue loss of blood, it is wise to leave existing conditions alone for one-half hour or an hour even, and most often in this interval the placenta will be delivered naturally. I am a firm believer in having the uterus definitely held. I think that if it is held, a separated placenta lodged at the internal os, causing a good deal of concealed hemorrhage, is in this way avoided; and in any case that has bled unduly I feel that the uterus should be watched carefully, until it stays practically continually in contraction, after the placenta is born.

The treatment of atonic uterus is directed toward restoring the tone of the organ. One of the most valuable procedures in the control of hemorrhage of this sort is the use of one or two minims of pituitrin intravenously. Ampules of pituitrin or ampules of the new ergot may be given intramuscularly, and there is no real limit to the amount of these drugs that may be so used. Occasionally an atonic uterus has to be packed, but fortunately this is rare.

Intelligent knowledge of how the uterus behaves after the birth of the baby is necessary to diagnose and treat postpartum hemorrhage due to any pathology associated with the placenta. This means that the uterus must be carefully held after the birth of the baby.

Part 2 will appear in next week's *Journal*.

THE TREASURER'S REPORT

Covering Refund Distribution

The Treasurer of the Massachusetts Medical Society makes the following report regarding the refund to District Societies for 1936.

The Council voted to distribute the sum of $5000 to District Societies. The total number of payments of annual dues received by the Treasurer, by March 2 to be counted for the refund, was 3516. Therefore the refund to the District Societies for each paid Fellow is $1.422.

The following table gives the number of payments in, and the refund to, each District:

District	Number Reported Paid	Check
Barnstable	42	$59.74
Berkshire	83	118.04
Bristol North	58	82.50
Bristol South	155	220.42
Essex North	149	211.89
Essex South	169	240.33
Franklin	37	52.63
Hampden	204	290.10
Hampshire	42	59.74
Middlesex East	84	119.47
Middlesex North	93	132.26
Middlesex South	696	989.72
Norfolk	602	856.05
Norfolk South	83	118.04
Plymouth	98	139.38
Suffolk	528	750.82
Worcester	321	456.47
Worcester North	72	102.40
	3516	$5000.00

In 1935, for comparison, the total number of payments for the refund was 3279.

Charles S. Butler, M.D.,
Treasurer.

April 2, 1936.

AIDS TO THE COMMITTEE OF ARRANGEMENTS

Suffolk District

Dr. J. P. Monks, 264 Beacon Street, Boston, Mass.

Dr. G. Kenneth Coonse, 370 Commonwealth Avenue, Boston, Mass.

Dr. Elizabeth DeBlois, 45 Bay State Road, Boston, Mass.

THE ANNUAL MEETING

The list of Springfield hotels with rates is published below for the convenience of those who may wish to secure reservations.

	Single		Double	
	Running Water	With Bath	Running Water	With Bath
Belmont		1.50-2.50		2.50-3.00
Bridgway	1.50-1.75	2.50-3.00	2.50-2.75	4.00-4.50
Charles	1.50-2.00	2.25-3.25	3.00-3.50	3.50-5.00
Clinton	1.50	2.00-3.00	2.50-3.00	3.50-5.00
Coolidge	1.25	1.50	2.00	2.50
Crown	1.50	2.00-2.50	2.50	3.00-3.50
Hawkins	1.00-1.50	2.00-2.50	1.50-2.50	3.00-4.00
Highland	1.50-2.00	2.00-3.00	2.50-3.00	3.50-5.50
Kimball	2.50	3.50-3.75	4.00	5.50-6.00
Oaks	1.50	2.50-3.00	3.00	3.50-4.00
Pynchon	1.00-1.50	2.00-2.50	1.50-2.50	3.00-5.00
Springfield	1.50	2.00	2.00	3.00
Stonehaven		2.50-4.00		5.00-7.00
Victoria	1.50-2.00	2.50	2.50-3.00	3.50
Worthy	1.50-2.00	2.50-3.00	2.50-3.00	3.50-6.00

THIRD ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning April 12:

Berkshire

Thursday, April 16, at 4:30 P.M., at the House of Mercy Hospital, Pittsfield. Subject: Diseases of the Liver — Surgical Problems in Diagnosis of Acute Disease of Gallbladder and Liver. Instructor: H. M. Clute. Melvin H. Walker, Jr., Chairman.

Bristol North

Wednesday, April 15, at 7:30 P.M., at the Morton Hospital, Taunton. Subject: Lung Diseases (Medical)—(a) Differential Diagnosis and Treatment of Lobar Pneumonia. (b) Symptoms and Signs in Chronic Lung Disease; Tuberculosis, Bronchiectasis, etc. Instructor: T. L. Badger. Arthur R. Crandell, Chairman.

Bristol South (New Bedford Section)

Friday, April 17, at 4:00 P.M., at the St. Luke's Hospital, New Bedford. Subject: Pediatrics (Surgical) — Abdominal Disease in Childhood. Instructor: W. E. Ladd. Harold E. Perry, Chairman.

Franklin

Wednesday, April 15, at 8:00 P.M., at the Franklin County Public Hospital, Greenfield. Subject: Cancer of Breast and Uterus. Instructor: G. A. Leland. Halbert G. Stetson, Chairman.

Middlesex North

Friday, April 17, at 7:00 P.M., at the Lowell General Hospital, Lowell. Subject: Acute and Chronic Nephritis. Instructor: J. P. O'Hare. Leonard C. Dursthoff, Chairman.

Norfolk

Friday, April 17, at 8:30 P.M., at the Norwood Hospital, Norwood. Subject: Review of Recent Progress in Medicine. Instructor: L. M. Hurxthal. H. B. C. Riemer, Chairman.

Worcester (Milford Section)

Wednesday, April 15, at 8:30 P.M., at the Milford Hospital, Milford. Subject: (a) Cancer of Stomach and Bowel. Modern Care of Inoperable Cancer. (b) Cancer of Genito-Urinary Tract. Instructors: E. G. Crabtree and C. C. Lund. Joseph I. Ashkins, Sub-Chairman.

MASSACHUSETTS LEGISLATIVE NOTE

HOUSE BILL 1635

In this bill Frank L. Whipple, Henry E. Oxnard, John Hall Smith, Horatio S. Card, Herbert Hitchen, Howard C. Gale, John M. Russell, their associates and successors, ask to be constituted a body corporate under the designation of the "Trustees of Middlesex University" and that they and their successors and others to be elected members of the Corporation shall remain a body corporate by that name forever. The duties of this corporation are set forth together with its educational functions and specifically the authority to *confer degrees which other colleges and universities have.*

The Middlesex College and University of Massachusetts, Inc., are authorized under the bill to transfer to the Middlesex University the various schools now maintained by these two institutions, all franchises, property, claims, trusts and estates now held by them and after these transfers the Middlesex College and the University of Massachusetts will pass out of existence except as the Middlesex College may be a department of the Middlesex University.

The report of the Department of Education of Massachusetts by the Commissioner James G. Reardon recommends that this petition be not granted. Since the attitude of Commissioner Reardon is evidently founded on a study of the University of Massachusetts and its component institutions, his opinion should be given due weight.

MISCELLANY

LARGE ATTENDANCE EXPECTED AT POSTGRADUATE INSTITUTE

Provision has been made for an expected attendance of at least 1,000 at the Philadelphia County Medical Society's Postgraduate Institute, to be held

in the Bellevue-Stratford Hotel, Philadelphia, April 20 to 24, inclusive.

Response to the preliminary announcements has exceeded the committee's expectations. Letters of inquiry have been received from physicians in twenty-five states—as far west as Missouri, as far south as Alabama and as far north and east as the New England States.

In view of the widespread interest in this initial effort by the county society of an outstanding medical center to provide advanced instruction for practicing physicians, it is virtually certain that the Institute will become an annual event.

This year's program, dealing entirely with cardiovascular and renal diseases and their far-flung ramifications, is being presented by fifty-three leading members of the faculties of the University of Pennsylvania School of Medicine and Graduate School of Medicine, Jefferson Medical College, Temple University School of Medicine, and the Woman's Medical College of Pennsylvania.

Registration, open to all physicians who are members of their local county medical societies, will begin at 10 A.M., Monday, April 20. The only charge is $5.00 to help defray the expenses of the Institute. Following a luncheon in the hotel, the scientific program will get underway at 2 P.M. Morning and afternoon sessions will be held on Tuesday, Wednesday, Thursday and Friday. There is no division of the program into sections. One paper will be read at a time, and all attending will be able to listen to the entire program.

In addition to the program there will be an interesting arrangement of technical exhibits in adjoining rooms, covering a wide range of articles used by the physicians or their patients.

The detailed program may be secured on application to Dr. Henry G. Munson, 4935 Catherine Street, Philadelphia.

THE NEW YORK HOSPITAL PLAN

The Executive Director of the Associated Hospital Service in and about New York City has disclosed that this organization will have 10,000 persons enrolled within a short time and expects to offer a special family membership plan very soon. In order to enlarge this scope of the service, studies of actuarial facts are underway.

The treasurer of the service reported that the three cents a day plan had invested $101,844 in U. S. Treasury bonds and that all expenses had been met promptly. One hundred and seventy-four hospitals in the metropolitan area are giving service under the plan.

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

Division of Adult Hygiene

Number 33 Cancer Clinic Bulletin April 1, 1936

Due to the large number of requests from physicians for suggestions regarding public speeches in the Coöperative Cancer Control Committees, we are publishing sample addresses written by different physicians in the bulletins of April, May and June:

The cancer problem comes home to every one of us because once past the age of forty, one out of every eight may expect to die of this disease, unless our present handling of the problem can be improved. This means that hardly a family is exempt. More than any other disease, cancer is a difficult one to treat because of the insidiousness of its onset, the difficulty of accurate diagnosis, the virtual impossibility of treatment in certain localities and the long period of painful illness involved. The three methods of treatment available are all costly, whether it be surgical, high voltage x-ray machines, or the use of radium. This cost rests on the community as well as the individual.

We are not all concerned with the treatment of cancer, but we are all concerned with its early recognition, because cancer is at first a local disease restricted to one organ or portion of an organ, and later becomes widely disseminated throughout the body. At this time cure is obviously impossible. The time, then, at which cancer can be most successfully treated is while it is still local. To establish diagnosis at this period, the medical profession must have the coöperation of all, because unless a person comes for diagnosis and treatment early, it is apt to be too late. The time to start treatment of cancer is as soon as possible after symptoms have appeared. Consequently all must be on the alert for the danger signs of the disease.

The most obvious and important of these symptoms is a sore which does not heal; a lump, particularly in the breast; or abnormal discharge of blood from any of the body cavities. These are not necessarily symptoms of cancer, but they should lead one to a physician in order to determine whether they are dangerous. Only through the alertness of each person can the present heavy toll of cancer be reduced.

One of the reasons that cancer is so insidious is that it is a disease of the body's own cells. It is not an invader attacking from without, but a treacherous change of one's own tissues. The essence of cancer is an abnormal uncontrolled growth of cells. These cancerous cells have a power of invading all parts of the body and may be carried there by the blood or the lymph stream as blazing brands are carried by the wind in a conflagration. Wherever these cancer cells may lodge, they grow true to their initial type and their behavior remains the same. Thus if we have a cancer develop in the stomach, its secondary deposit or metastasis will look like the cells of the stomach whether they occur in the lungs, liver or bones. This power of spread is what makes early treatment of cancer so essential. Obviously the disease can be treated while it is local, but once it has become disseminated to other organs, treatment is virtually hopeless.

Often the question comes up as to what causes cancer. In all probability, there is no one cause. The search for a single cause is as hopeless as that

for the philosopher's stone. There are a number of causes for cancer; some of these we know, others we do not know. We know that there are certain complex hydrocarbon substances which can be developed from coal-tar products that have the power of producing cancer to an extraordinary degree. If one takes certain of these substances and applies them to the skin of a mouse or rat or injects them into the tissue beneath the skin, a cancer will develop at the site of application within a few weeks. These so-called carcinogenic substances are somewhat related as regards their chemical formulae. Their mode of action is apparently through causing continued destruction of tissue with repeated efforts at repair so that one has a continuous active growth of cells which ultimately will develop into cancer. It has long been known that workers handling aniline were particularly apt to develop cancer. Many of you will remember the cancers that developed in the New Jersey girls who swallowed minute amounts of radio-active compounds in the course of painting luminous dials on watches.

The early workers in x-ray give us still another example of a means by which cancer can be produced. These men, enthusiastic over the great benefits that the x-ray gave in establishing diagnosis, were alert only to its good features and did not realize the danger of repeated exposure to so powerful a force. As a result, most of the pioneer workers in the field have developed cancer of the skin at various points exposed to the x-rays, particularly the hands. There is but little danger attached to a single exposure, but repeated exposures are dangerous.

Many of the cases of cancer can be traced to what is called chronic irritation; that is, repeated injuries to various tissues of the body and attempts of the cells of which those tissues are made up, to repair the injuries. We may say that cells have two chief aims, one to multiply, the other to function. Normally a balance is maintained between these two. With repeated attempt of repair and growth, the function of multiplication becomes more and more improved until the cell runs wild, so to speak, and multiplies rapidly at the expense of the adjoining structures. This, in essence, is a cancer. Instances of cancer due to chronic irritation are constantly presented. Cancer may develop in a long-standing sore of the cheek caused by a jagged tooth or an ill-fitted plate. Cancer of the intestines may develop in a polyp subject to irritation. Cancer of the skin may develop at the edge of a varicose ulcer. One of the most interesting forms of cancer due to chronic irritation is that provided by a tribe in the vicinity of Kashmir in India. This tribe lives in a high altitude. They are nomads. Consequently, in the absence of houses in which to shelter themselves, they carry beneath their clothing an earthenware pot which is filled with glowing charcoal (in order to keep warm). Not infrequently they develop burns of the abdominal wall from this so-called "kangri basket," and in the site of these burns cancer very frequently develops.

Chronic irritation, then, we may consider as one cause of cancer. The tissue changes brought about by exposure of x-ray and radium, under certain conditions, we can regard as a cause of cancer. In lower animals, there are certain types of cancer which develop as a result of parasitic virus infection and there are those who have attempted to ascribe human cancer to the action of a virus, but this is regarded as definitely unlikely.

Heredity has been spoken of as still another cause. We know enough from work with animals to realize that heredity may play a part. We know we can breed a strain of animal in which tumors develop and another strain in which they rarely develop. But these strains must be carefully inbred over long periods of time and as long as human beings select their mates for looks, brains, or wealth, there will be no chance of getting at the cancer problem from the angle of heredity. Moreover, before heredity can be surely established as a cause of cancer, we should have accurate records for at least fifteen or twenty generations. With all our science and with all the progress that medicine has made, there are few people who can tell what all four of their grandparents died of, let alone their great-grandparents. Probably two or three centuries must pass before we can get accurate information as to hereditary cancer in human beings.

We do know, however, that certain people are more susceptible than others to cancer and that a person who has had one cancer is far more likely to develop a second even though the first may be cured, than is a person who has had no cancer. There is then a definite susceptibility to cancer but what determines that susceptibility we cannot say. The experimental work done on lower animals has been and is a tremendous help in solving various phases of the cancer problem. Cancer can be transplanted from one animal to another and placed in any locality desired, so that its effect can be studied and the most safe treatment be developed.

The question is often raised as to whether cancer is contagious, whether there is any possibility of getting cancer while nursing a patient who has cancer, or in using the same article which he has used. There is none, because cancer can be transmitted only through the direct inoculation of tumor cells from one living body directly to another, and even this practically never occurs in human beings, although with suitable operative procedures it can be carried out in animals. The one outstanding point for us to keep continually in mind is that if we are to prevent the tremendous amount of human suffering and economic loss entailed by this disease, we must recognize it early and treat it vigorously.

CERTIFIED MILK REPORT OF THE MEDICAL MILK COMMISSION OF BOSTON FOR 1935

The Medical Milk Commission of Boston, Inc., submits this report of its activities during 1935 in the hope that a glance at its contents will make the reader realize that present-day Certified Milk is a far

better and safer product than that in bygone years. The members of the Commission believe that in its raw state the milk is as nearly safe as is humanly possible and when pasteurized it is the best milk obtainable anywhere.

Certified Milk is produced under the regulations of the Massachusetts Department of Public Health and the annually revised Methods and Standards of the American Association of Medical Milk Commissions. These form the strictest code of milk production with which we are familiar. We believe that our producers are in good faith trying to live up to the code. If we did not so believe, we would not be willing to grant them our certificate.

The herds are all accredited, that is, free from tuberculosis according to the tests and rules of the Federal Bureau of Animal Industry.

They are almost free from contagious abortion (Bang's Disease). Of 1433 samples of blood tested during the year only two gave a positive agglutination test. These animals were immediately removed from the herds.

TUBERCULIN TESTS FOR 1935

Name of Farm	Date of Test	Number of Cows Tested	Number of Reactors	Per Cent of Reactors
Cherry Hill	August 17, 1935	181	3*	1.66
Hampshire Hills	January 19, 1935	230	0	—
Walker Gordon	April 4, 1935	363	0	—
Total		774	3	0.39

*No visible lesions on postmortem examination. Accredited herd certificates continued by Bureau of Animal Industry.

AGGLUTINATION TESTS FOR 1935

Farm	Date	Total Samples	Negative	Positive	Doubtful
Cherry Hill	January	161	158	0	3
	May	182	152	0	30
	July	180	166	0	14
	September	179	164	1	14
Hampshire Hills	May	217	193	0	24
	December	225	216	1	8
Walker Gordon	June	289	260	0	29
		1433		2	

The feed of the milking cows is selected with the ideal of maintaining optimum mineral, protein and vitamin content in the milk the year round and not solely from the point of view of maximum milk and butterfat output.

The feed of approximately three quarters of the cows is specially reinforced by the addition of irradiated yeast. Bio-assays of the resulting "Vitamin D Milk" are made for the Commission by Professor J. W. M. Bunker of Massachusetts Institute of Technology. The results were reported in Steenbock Units per quart until December, 1935, when the new U. S. P. Vitamin D units were followed. (160 Steenbock Units equal 430 U. S. P. Vitamin D units.) In the fall of 1934 the manufacturer of the irradiated yeast advised the farms to reduce slightly the amount of yeast fed, with the result that Hampshire Hills fell below the established standard in the November test and Cherry Hill and Walker Gordon in the February test. The Commission immediately ordered the farms to resume the earlier dosage and forbade them to vary the dosage in the future without our permission.

We believe that "Vitamin D Milk" containing 430 U. S. P. units per quart is as adequate an antirachitic agent as cod liver oil or Viosterol in their usual dosage and that it is more palatable, convenient and likely to be taken by the patient. It must be sharply distinguished from irradiated milk which contains only 50 Steenbock or 135 U. S. P. units of Vitamin D per quart.

The health of the cows is supervised by Dr. W. T. White, a veterinarian appointed by and responsible to the Commission. No serious conditions among the herds were discovered during the year.

The health of the men is supervised by physicians living near the farm. These men are appointed by and are responsible to the Commission. They make a physical examination of all new employees before they are allowed to handle milk. This examination includes cultures from the nose and throat and of the stools. They also see immediately all sick employees and quarantine or exclude from contact with the milk any men with diseases possibly transmissible

BIO-ASSAYS FOR VITAMIN D

Name of Farm	Oct., 1933 Steenbock Units per quart	March, 1934 Steenbock Units per quart	Nov., 1934 Steenbock Units per quart	Feb., 1935 Steenbock Units per quart	Dec., 1935 U. S. P. Units per quart
Cherry Hill	160	more than 160	160	less than 160	more than 430
Hampshire Hills	160	more than 160	less than 160	more than 160	430
Walker Gordon	more than 160	more than 160	160	less than 160	more than 430

BACTERIA COUNTS 1935

Certified Milk Raw

Name of Farm	Number of Bacteria Counts	Number Over 10,000	High Counts in Detail
Cherry Hill	109	4	11,000 11,700 11,900 13,900
Hampshire Hills	109	3	11,800 15,700 19,100
Walker Gordon	109	3	11,500 11,900 19,200

Summary—Certified Milk Raw

	Times		Per Cent	
5,000 and below	281		85.93	
5,001 through 10,000	36		11.01	
	—	317	—	96.94
10,001 through 15,000	7		2.14	
15,001 through 20,000	3		.92	
Over 20,000	0		0	
	327		100.00	

Certified Milk Pasteurized

Name of Farm	Number of Bacteria Counts	Counts of —100	Counts of 100	Counts of 200	Counts of 300	Counts of 400–700	Counts of Over 700	High Counts in Detail
Cherry Hill	98	67	23	4	2	2	0	500 600
Hampshire Hills	107	82	22	3	0	0	0	
Walker Gordon	106	69	29	7	1	0	0	

Summary—Certified Milk Pasteurized

	Times		Per Cent	
Counts of less than 100	218		70.09	
Counts of 100	74		23.80	
	—	292	—	93.89
Counts of 200	14		4.50	
Counts of 300	3		.96	
Counts of 400-700	2		.65	
Counts of over 700	0		—	
	311		100.00	

through milk. During 1935 there were no serious diseases reported although a number of minor infections were so excluded.

Bacteria counts are the best laboratory check we have on the conditions under which milk is produced and handled. Our samples are collected by our agent from the distributing depots and delivered to the laboratory of the Department of Comparative Pathology at the Harvard Medical School where the counts are made. The standard plate method is used except that 6 per cent defibrinated horse blood is added just before the plates are poured. This enables the laboratory to detect the presence of hemophilic organisms, but has the disadvantage of giving counts approximately 20 per cent higher than those obtained by the unmodified standard plate method.

One of the requirements for Certified Milk is that it shall be bottled on the farm where it is produced. The same rule applies to pasteurization. Each farm has its own pasteurization outfit which is used for no other grade of milk. Cherry Hill and Walker Gordon pasteurize in holding tanks and then cool and bottle. Hampshire Hills pasteurizes in the bottle.

"Methods and Standards for the Production of Certified Milk" state that the milk shall contain not over 10,000 bacteria per cubic centimeter, and after pasteurization not more than 500 per cubic centimeter. In 327 counts of Certified Milk Raw only 3 per cent of these counts were over 10,000 bacteria per cubic centimeter and 86 per cent were 5,000 and under. In 311 counts of Certified Milk Pasteurized in only one count was it over 500 bacteria per cubic centimeter and in 94 per cent the counts were 100 or less.

J. Herbert Young, M.D.,
Chairman,
Lewis Webb Hill, M.D.,
Franklin G. Balch, M.D.,
Joseph Garland, M.D.,
Albert A. Hornor, M.D.,
William B. Keeler, M.D.,
Health Commissioner of Boston,
Edwin T. Wyman, M.D.,
Elmer W. Barron, M.D.,
Stewart H. Clifford, M.D.,
R. Cannon Eley, M.D.,
Richard S. Eustis, M.D.,
Secretary and Treasurer.

AN HONOR TO THE MEMORY OF DR. NATHAN COOLEY KEEP

As an especial feature of the annual Alumni Day or joint clinical meeting of the Harvard Dental Alumni Association and the Harvard Odontological Society, April 3, 1936, a portrait of Dr. Nathan Cooley Keep was unveiled in Vanderbilt Hall, the gift of the artist, Mrs. Marie Danforth Page, whose husband is a grandson of Dr. Keep. The portrait was unveiled by Miss Elizabeth Keep, the great-granddaughter of Dr. Keep. Dr. Leroy M. Miner received the portrait in behalf of the school and Mr. Henry L. Shattuck, Treasurer of Harvard College, accepted it in behalf of the Harvard Corporation.

Dr. Keep graduated from the Harvard Medical School in 1827 and practiced dentistry in Boston for many years. He was interested in the founding of the Massachusetts Dental Society, serving as its first president and the first dean of the Harvard Dental School.

SOCIAL SECURITY BOARD APPROVES PUBLIC ASSISTANCE PLANS OF OHIO, MASSACHUSETTS, ARKANSAS, VERMONT, WASHINGTON AND OKLAHOMA

The Social Security Board approved public assistance plans of six States on March 31: the Arkansas State plans for aid to the needy aged, the blind and to dependent children; the Vermont State plans for aid to the blind and dependent children; the Washington State plan for aid to the blind; the Ohio State plan for aid to the needy aged, the Massachusetts State plan for aid to the needy aged and the Oklahoma State plans for aid to the needy aged and to dependent children.

As a result of the Board's action these States will receive allotments of funds from the Federal Government to match their own expenditures for assistance to the needy aged, dependent children, and the blind. The Federal grant will be as much as the States themselves spend in the case of assistance to aged persons and aid to the blind, up to a combined total of $30 a month per person, plus 5 per cent of the amount of the Federal grant to help cover the States' administrative expenses. For aid to dependent children the Federal grant to States with approved plans will be one dollar for every two dollars the State spends, up to a combined total of $18 per month for the first dependent child in any one family and $12 per month for each additional child in the family.

This approval by the Social Security Board brings the number of States with approved public assistance plans to 27 in the case of aid to the needy aged, 18 for aid to the blind and 17 for aid to dependent children. Almost 500,000 individuals are affected by these plans; 390,000 aged men and women; 86,187 dependent children and 17,543 needy blind.

The public assistance plans approved on March 31 are expected to provide aid to 91,167 aged persons in Ohio; 25,600 aged persons in Massachusetts; 11,000 aged, 300 blind persons and 550 dependent children in Arkansas; 175 blind persons and 577 dependent children in Vermont, and 700 blind persons in Washington.

In Massachusetts the average rate is $25.55 per person. Payments to the blind in Vermont are estimated at an average rate of $11.50 per month to each individual and payments to dependent children at $9 per month.

To be approved by the Social Security Board, under the terms of the Social Security Act, a State public assistance plan must provide for cash pay-

ments to needy aged persons, to dependent children living with relatives, or to the needy blind in all parts of the State. A single State agency must administer the plan or supervise its administration, if it is directly administered by the Counties. This State agency must grant the opportunity for an appeal from the decision of any county denying assistance to an applicant.

CASES AND DEATHS IN MASSACHUSETTS, WITH CASE AND DEATH RATES PER 100,000 POPULATION FOR REPORTABLE DISEASES DURING THE YEARS 1934 AND 1935

MASSACHUSETTS

Diseases	1935 Cases	1934 Cases	1935 C. R. per 100,000* Pop.	1934 C. R. per 100,000§ Pop.	1935 Deaths	1934 Deaths	1935 D. R. per 100,000 Pop.	1934 D. R.
Actinomycosis	3	1	0.1	†	3	1	0.1	†
Ant. Polio.	1,392	76	31.9	1.8	61	9	1.4	0.2
Anthrax	3	5	0.1	0.1	—	—	0.0	—
Chickenpox	10,836	10,990	248.4	253.3	9	12	0.2	0.3
Diphtheria	390	629	8.9	14.5	26	50	0.6	1.2
Dog Bite	10,481	8,863	240.3	204.3	—	—	—	—
Dys. Amebic	12	31	0.3	0.7	1	3	—†	0.1
Dys. Bacillary	24	238	0.5	5.5	6	17	0.1	0.4
Enc. Lethargica	16	36	0.4	0.8	16	25	0.4	0.6
Ep. C. S. Meningitis	83	66	1.9	1.5	55	28	1.3	0.6
German Measles	33,265	1,005	762.7	23.2	6	—	0.1	—
Gonorrhea	6,193	6,538	142.0	150.7	7	11	0.2	0.3
Hookworm	1	—	—†	—	—	—	—	—
Lob. Pneumonia	4,370	3,976	100.2	91.6	1,731	1,601	39.7	36.9
Malaria	17	27	0.4	0.6	1	2	—†	.05
Measles	12,352	44,817	283.2	1,032.8	37	91	0.8	2.1
Mumps	5,620	4,310	128.8	99.3	3	2	0.1	.05
Oph. Neon.	1,076‡	1,072‖	24.7	24.7	—	—	—	—
Paratyphoid	5	6	0.1	.1	1	1	—†	†
Pellagra	17	9	0.4	¶	16	13	0.4	0.3
Rabies	2	1	0.1	†	2	1	0.1	†
Scarlet Fever	8,304	8,391	190.4	193.4	57	76	1.3	1.8
S. S. Throat	195	201	4.5	4.6	39	60	0.9	1.4
Smallpox	—	—	—	—	—	—	—	—
Syphilis	5,317	4,471	121.9	103.0	177	159	4.1	3.7
Tetanus	22	20	0.5	0.5	20	20	0.5	0.5
Trachoma	31	33	0.7	0.8	—	—	—	—
Trichinosis	47	46	1.1	1.1	2	4	0.1	0.1
Tuberculosis, Pul.	3,592	3,585	82.4	82.6	1,813	1,902	41.6	43.8
Tuberculosis, O. F.	387	448	8.9	10.3	148	214	3.4	4.9
Tbc. Hilum	622	855	14.3	19.7	—	—	—	—
Typhoid Fever	112	134	2.6	3.1	10	13	0.2	0.3
Typhus Fever	2	2	0.1	.05	—	—	—	—
Undulant Fever	42	15	1.0	.3	1	—	—†	—
Whooping Cough	5,566	12,659	127.6	291.7	67	125	1.5	2.9
	110,397	113,556			4,315	4,440		

*Population 4,361,570.
†Less than .05.
‡30 of these were gon. oph.
§Population 4,339,210.
‖35 of these were gon. oph.
¶Incompletely reported.

—*Bulletin, State Department of Public Health.*

AFFAIRS IN CONNECTICUT

SILICOSIS IN CONNECTICUT

Verne A. Zimmer, director of the federal bureau of labor standards, created considerable discussion in Connecticut recently by stating that approximately 133,322 or 37 per cent of Connecticut industrial workers are exposed daily to industrial silicosis. In the same statement Mr. Zimmer branded the Connecticut state compensation law "inadequate and

unfair" both to workmen and employers as to its silicosis provisions.

All this controversy has arisen as an aftermath of the recent revelations of its prevalence among the unfortunates who are employed on the Gauley Bridge, West Virginia, tunnel project. Mr. Zimmer makes a point of the fact that the Connecticut compensation laws make no special provision for silicosis. To mention specifically the occupational diseases for which compensation can be awarded would weaken the laws, for it would be virtually impossible to list by name all of the diseases that may result from employment. Instead, the law declares that wherever "personal injury" appears "it shall be construed to include x x x x occupational disease," and occupational disease itself is defined as "a disease peculiar to the occupation in which the employee was engaged and due to causes in excess of the ordinary hazards of employment as such." Under that definition not only the sufferer from silicosis but those affected with glass-blower's cataract, miner's ankylosis, pitch cancer, caisson disease, etc., are protected.

Mr. Zimmer also stated that silicosis, because of its special effect on workmen, cannot be compensated for as are other industrial diseases. The 1935 session of the Connecticut Legislature made one important change in the Compensation Code which provides that an application may be filed at any time within a year after the first manifestation of an occupational disease, and defines "first manifestation" as the first appearance of the effects of the disease "in such manner as is or ought to be recognized by him (the employee) as symptomatic of the occupational disease for which compensation is claimed". Mr. Zimmer apparently was not aware of this recent change in the Code.

It is difficult to see how any serious silicosis condition could exist in Connecticut, provided the laws are properly administered. The Health Code of the State provides that all occupational diseases must be reported by the physician in attendance, to the State Department of Health. An investigation by the State Department follows. In the event that conditions dangerous to the health of the workers are found, the installation is required of protective devices or such other measures as may be necessary to safeguard the employees. Connecticut's compensation laws as they apply to industrial diseases are among the most advanced in the country. In fact, the Compensation Code as it exists in Connecticut today has been urged on states possessing lower standards as a model on which to pattern their own laws.

The federal bureau of labor recommends the following standards for employers:

(1) Prevention of silicosis lies entirely in keeping the dust from getting into the air, and therefore, prevention is mainly an employer's problem.

(2) Control of dust at the point of origin by the use of local exhaust systems or wet methods, or a combination of both. Wetted dust may dry out and re-enter the air, therefore dust must be removed and disposed of.

(3) General ventilation will help reduce silica concentration which should never exceed 5,000,000 particles of pure silica per cubic foot.

(4) Clean floors, walls and benches regularly by vacuum, or wet brushing and sweeping, and preferably outside of working hours. Wet down foundry floors at frequent intervals.

(5) Have sand-blasting done only with articles completely enclosed or protect workers by positive pressure masks.

(6) Have medical examinations, with lung x-rays, of employees at intervals not exceeding one year. Remember that most workers with simple silicosis may safely continue at work if the dust hazard is removed.

(7) Make dust surveys and analyses frequently to determine exactly the dust hazard of the plant.

Annual Meeting of Hartford Municipal Hospital

James C. Wilson, M.D., was elected president of the staff of the Municipal Hospital at its annual meeting on March 3, 1936, to succeed Anthony W. Branon, M.D. A new office was created, that of vice-president, and to this office Harry L. F. Locke, M.D., was elected. Walter L. Hogan, M.D., was elected secretary. New appointments and promotions included the following: James E. Davis, bronchoscopist; H. N. Hurwitz, orthopedist; N. Samponaro, otolaryngologist; Milton F. Little, ophthalmologist; Eliot S. Cogswell, roentgenologist; Louis H. Gold, assistant neuropsychiatrist; Edgar Butler and J. L. Gothers, assistant dentists; Philip Adalman and A. R. Schwartz, assistant ophthalmologists and otolaryngologists; J. R. Glazier and J. F. McGrath, assistant surgeons; Charles Bingham, assistant physician; C. J. McCormack, assistant gynecologist; E. H. Crosby, assistant orthopedic surgeon; H. M. Glaubman, assistant pediatrician.

Infant Mortality

The State Department of Health has announced the infant mortality for 1935 in Connecticut to be 43.2 under one year of age per 1000 births. Actually there were 944 deaths and 21,860 living births. In 20 years, from 1916 to 1935, the death rate for infants under one year of age has dropped from 100.8 to 43.5. More than one half of the deaths occurred during the first week after birth, and of these the greater part occur the first day. The greatest single cause of death is prematurity.

Federal Funds Received

On March 2, 1936 Governor Cross received from the Social Security headquarters at Washington a check for $6,379.16, the first installment of a contribution the Federal Government is making for the extension of maternal and child care under the Connecticut State Department of Health. Dr. Os-

born, State Health Commissioner, recently expressed the hope that these funds will permit the State among other activities to undertake a broad study of cancer control. Already there is a statute authorizing the State Department of Health to make certain investigations concerning the prevention and treatment of cancer and to take such action as it may deem of assistance in bringing about a reduction in mortality from this disease.

Connecticut has made decided progress in cancer prevention work but it has not developed as unified and comprehensive a plan as has Massachusetts in the past ten years. The Connecticut State Medical Society, in addition to supporting the cancer control act, has formed a special tumor committee under the chairmanship of Dr. Thomas H. Russell of New Haven. As a result of this committee's work there are now nine or ten cancer clinics in operation in the State and work in research and publicity is progressing.

Title of Norwich Health Officer Contested

Dr. Harrison Gray, Health Officer of Norwich for a four-year term up to October 1, 1935, claims the appointment to the office on November 4, 1935 by County Health Officer Richard L. Norman and his claim was substantiated by Judge Allyn M. Brown in Superior Court. Dr. Albert Quintiliani has appealed from Judge Brown's decision to the Supreme Court, claiming that he was appointed by Mayor Moran on the same day and the appointment confirmed by Court of Common Council. Dr. Quintiliani's appointment seems to have missed out by a few hours.

Connecticut Mutual Life Insurance Company Pays Tribute to Dr. Charles D. Alton

On March 2, 1936 Dr. Charles D. Alton, ninety years old, was tendered a dinner at the Hartford Golf Club by the official staff of the Connecticut Mutual Life Insurance Company. This occasion marked the completion of sixty years of continuous service by Dr. Alton. James Lee Loomis, president of the company and toastmaster at the dinner, lauded the "splendid fidelity" of Dr. Alton in discharging his duties with the company over more than half a century, praised the retiring medical referee's "rare philosophy of life" and his "internal resources of character" and presented to him the company's service medallion with a specially inscribed bar in token of his sixty years of service. A gift of a morocco portfolio containing some three hundred testimonial letters from friends in the life insurance business and medical profession was presented to Dr. Alton, also a silver tray equipped with decanter and wine glasses, the bottom of the tray being inscribed with the names of the officers of the company.

Dr. Alton in his remarks narrated the difficulties the company experienced in its early days in obtaining competent medical examiners in those places where the physicians "knew nothing of insurance and hardly more about medicine". In a few words he painted "the sombre heaviness" of Savannah, Ga., during a trip he made there in 1877 when a yellow fever epidemic was lifting. Humorously Dr. Alton described some of the adventures that comprised the "routine" of his early days as medical examiner for the Connecticut Mutual, referring to the manner in which he built up the company's field medical examining resources.

Dr. Charles D. Alton has been active in medical circles, being a past president of both the Hartford Medical Society and the Hartford County Medical Association. He was also formerly vice-president of the Amercan Climatological and Clinical Association.

RECENT DEATHS

BATEMAN—Frank E. Bateman, M.D., of 163 Highland Avenue, Somerville, Massachusetts, died at his home, April 5, 1936. Dr. Bateman was born in Fitchburg, Massachusetts, in 1866. After graduating from the Harvard Medical School in 1894, he began practicing in Charlestown but after four years moved to Somerville.

Dr. Bateman was a Fellow of the Massachusetts Medical Society and the American Medical Association.

His widow, Mrs. Sophie C. Bateman; two daughters, Mrs. Robert Jones, of West Medford, and Miss Silvia Bateman, of Somerville, and a son, Leon W. Bateman, of West Acton, survive him. There are also five grandchildren.

BONGIORNO—Felice Bongiorno, M.D., died at his home in Waltham on February 20, 1936. Death was due to coronary thrombosis.

Dr. Bongiorno was born in Malfa, Italy, on June 14, 1893. He was educated in Italy and served with the Italian Medical Corps for five years, being wounded once and receiving the Croix de Guerre. He graduated in medicine from the University of Naples in June 1919, coming to this country in 1922 and locating in Waltham, Massachusetts at that time. He was licensed to practice medicine in the State of Massachusetts in 1923 and he became a Fellow of the Massachusetts Medical Society in 1928.

He was married in 1930. Dr. Bongiorno is survived by his widow, nee Rosanna Gaudreau, and two children.

BARRETT—Albert Moore Barrett, M.D., formerly associated with the Massachusetts Department of Mental Diseases, died at his home in Ann Arbor, Michigan, April 2, 1936. He began his career in the field of Mental Diseases and served on the staff of the Iowa State Hospital for the Insane. Dr. Barrett then went to the Danvers (Mass.) Hospital for the Insane, and, after serving there about four years,

was advanced to the position of Assistant Psychiatrist at the Worcester Insane Hospital.

In 1906 he was called to the University of Michigan and became the organizer of the first university hospital and clinic for mental diseases in the United States. This institution was a part of the University of Michigan and Dr. Barrett had been the Professor of Psychiatry at this University Medical School since 1920.

He had been president of the American Psychiatric Association, the American Neurological Association, and the Psychological-Pathological Association. A son, Edward Bowman Barrett, survives him. His wife, Mrs. Eliza Jane (Bowman) Barrett, died several years ago.

NOTICES

AN EXHIBIT OF ATHLETIC SCULPTURE BY DR. R. TAIT McKENZIE

Dr. R. Tait McKenzie of Philadelphia will exhibit his conceptions of artistic athletic development at the Doll and Richard's Gallery, 138 Newbury Street, Boston, from April 12 to April 25, 1936.

Dr. McKenzie has an established reputation in the field of physical education and during the World War organized the first rehabilitation camps in England, United States and Canada.

BOSTON UNIVERSITY SCHOOL OF MEDICINE SURGICAL CLINIC AT THE BOSTON CITY HOSPITAL

Friday, April 17, 12-1, Cheever amphitheatre.

Dr. Richard H. Miller, Assistant Professor of Surgery, Harvard Medical School, and Visiting Surgeon, Massachusetts General Hospital, will speak on Acute Abdominal Pain.

Physicians and medical students are invited.

THE NATIONAL TUBERCULOSIS ASSOCIATION

The National Tuberculosis Association has a membership of physicians, nurses, health workers, public-spirited citizens and other individuals and agencies which furnish to it a means for moral support of its work. Membership in the National Tuberculosis Association is semiprofessional. Individual membership is open to anyone who wishes to join. The membership fee for regular individual membership is $5.00 a year. The Association also has associate memberships at $10 a year, sustaining memberships at $20 a year, and life memberships at $100. All members of the Association are given free a subscription to the monthly Bulletin of the National Tuberculosis Association, the annual volume of Transactions containing papers read at the annual meeting or a choice of several other publications. An application card for membership will be sent on request. Checks should be made payable to Collier Platt, Treasurer, and sent to 50 West 50th Street, New York, N. Y.

CALENDAR OF LECTURES AND RADIO TALKS LISTED IN BOSTON HEALTH LEAGUE OFFICE —APRIL, 1936

April 13—*Self-Measurement as a Group Guidance Technique*—Richard D. Allen. Sponsor, B. U. School of Education. 29 Exeter Street. 7:15 P.M. $1.50.

April 14—*Metabolism*—WBZ, 4:45 P.M. Sponsors, Massachusetts Medical Society and Massachusetts Department of Public Health.

April 14—*Preparation for Vacation*—Sponsor, Class Rm. Teachers' Sect., New England Health Education Association. Emma Rogers Room, M. I. T. Supper at 6 P.M., 60c, talk at 7 P.M.

April 14—*Leanness and Fatness in Terms of Body Build*—Dr. S. J. Thannhauser. Sponsor, Massachusetts Dietetic Association. 8 P.M. 46 Beacon Street. Non-members 25c.

April 16—*State Private Duty Nurses' Dinner*—Sponsor, Massachusetts State Nurses' Association. 6:30 P.M. Hotel Bancroft, Worcester. Ticket for dinner and transportation, through Alumnae.

April 21—*Health of the School Child*—WBZ, 4:45 P.M. Sponsors, same as April 7 and 14.

April 21—*Field Trip, E. L. Patch Company*—Sponsor, Massachusetts Dietetic Association. 46 Beacon Street. 2 P.M.

April 21—*Some Fallacies in Social Hygiene Teaching*—Dr. Helen McGillicuddy. Sponsor, Full Time Teachers' Sect., New England Health Education Association. Emma Rogers Room, M. I. T. Supper at 6 P.M., 60c; talk at 7 P.M.

April 27—*The Problems of the Adolescent*—Augusta F. Bronner, Ph.D. Sponsor, B. U. School of Education. 29 Exeter Street. 7:15 P.M. $1.50.

April 28—*Cosmetics and Common Sense*—WBZ, 4:45 P.M. Sponsors, Public Education Committee of Massachusetts Medical Society and Massachusetts Department of Public Health.

Tuesdays 1:30 P.M.—*Health Review*—Courtesy WEEI. Sponsor, Massachusetts Department of Public Health.

Fridays 4:45 P.M.—*Health Forum*—Courtesy WEEI. Sponsor, Massachusetts Department of Public Health.

INTERNATIONAL CARDIOLOGICAL MEETING

ROYAT (AUVERGNE) ASSEMBLY OF PHYSIOLOGISTS, PATHOLOGISTS AND THERAPEUTISTS, MAY 31-JUNE 1, 1936

Various professional groups of Royat, namely, the Medical Society, the Mineral Water Company, the Publicity Commission, the Hotel Syndicate, the Local Information Bureau and the Municipalities, have decided to organize at regular intervals International Cardiological Meetings to be held at Royat.

Questions will be discussed at each meeting from

the physiological, pathological and therapeutic point of view.

Each question will be chosen from among the problems of present-day science and will be discussed by lecturers whose personal research, competence and recognized authority are certain guarantees of the value and importance of each session.

The reports will be printed and distributed in the form of brochures. Each brochure will contain a summary of the latest developments concerning the question studied and in all will constitute a cardiovascular library of great value to the practitioner. The unpublished documents, valuable diagnoses and therapeutic indications can be used advantageously by the physician in daily practice.

The first International Cardiological Meeting will be held at Royat during Whitsuntide, 1936 (May 31-June 1). The question to be discussed is: Vascular Spasm.

Professor Vaquez will preside at the meeting.

Reports will be delivered by:

Professors C. Heymans of Ghent and Lucien Brouha of Liege: Physiological Aspect of the Vascular Tonus.

Professor Riser of Toulouse: Vascular Spasm of the Brain.

Professors Leriche and Fontaine of Strasbourg: Vascular Spasm and the Limbs.

Professors Maranon and Duque of Madrid: Relation of Vascular Spasm to Endocrinology.

Professor Loeper of Paris: Treatment of Vascular Spasm.

MEDICAL CLINIC AND STAFF ROUNDS AT THE PETER BENT BRIGHAM HOSPITAL

At 3:30 P.M. on Thursday, April 16, in the Amphitheatre of the Peter Bent Brigham Hospital, Dr. Henry A. Christian, Physician-in-Chief, Hersey Professor of the Theory and Practice of Physic in the Harvard Medical School, will give a medical clinic. To it are cordially invited practitioners and medical students.

On Saturdays in the wards of the Peter Bent Brigham Hospital, from 10 to 12, staff rounds will be conducted by Dr. Christian.

A PHOTOGRAPH OF DR. IRA VAN GIESON WANTED

In connection with the compilation of the history of the New York Psychiatric Institute, Dr. C. O. Cheney, 722 West 168th Street, New York City, would like a photograph of Dr. Van Gieson.

REPORTS AND NOTICES OF MEETINGS

NEW ENGLAND HEART ASSOCIATION

The monthly clinical meeting of the New England Heart Association was held at the Memorial Hospital, Worcester, on February 24, 1936.

The first paper of the evening was given jointly by Dr. O. H. Stansfield and Dr. E. H. Halloran and was devoted to the early and remote effects of acute contagious diseases upon the heart. The effect of diphtheria toxin on the myocardium was taken as an extreme example. In diphtheritic myocarditis the mortality was high but if recovery occurred it was almost always complete. It is reasonable to assume, however, that in some apparently completely recovered cases scars are left in the myocardium which may contribute to heart failure in later life. In scarlet fever in addition to direct cardiac damage the risk of renal injury must be borne in mind as this may lead eventually to cardio-vascular-renal disease. Influenza may be followed by circulatory weakness which persists for months or even years. In all acute contagious diseases the possibility of cardiac involvement must be considered and violent exertion during convalescence prohibited.

Dr. Frank B. Carr reported his observations on six cases of acute benign pericarditis occurring in otherwise healthy young people without evidence of myocardial or endocardial involvement. These cases were considered to be analogous to cases of acute fibrinous pleurisy in which there is no significant involvement of the parenchyma of the lung and no pleural effusion. It was suggested that such cases frequently had escaped recognition because the onset is often that of an acute respiratory infection, accompanied by the generalized muscle pains usually associated with grippe, and the pericardial friction rub may not appear until relatively late in the course of the infection.

Dr. John J. Dumphy spoke on the subject of Angina Pectoris Complicating Pernicious Anemia. In a group of thirty-one cases of pernicious anemia seen by the author, nine presented the typical anginal syndrome. Eight of them were followed over a period of from two to eight years, averaging five years. All were relieved of anginal attacks while under treatment of the anemia, but four subsequently developed acute coronary thrombosis with definite clinical and electrocardiographic evidence. It was also noted that several patients in this series developed significant rises in blood pressure as their anemia improved under treatment.

SOUTH EASTERN MASSACHUSETTS HEALTH OFFICERS' ASSOCIATION

Some thirty health officials of towns from Brockton to the tip of Cape Cod met in Hyannis on Wednesday, January 29, for the regular quarterly meeting of the South Eastern Massachusetts Health Officers' Association. The president called for the regular business meeting, in the course of which Mr. A. J. Strawson, the recently appointed Executive Secretary of the Massachusetts Tuberculosis League, was made honorary member of the association.

The principal speaker was Dr. Mary R. Lakeman of the Cancer Division of the Massachusetts Department of Public Health, who outlined the efforts of

the division toward the control of cancer on Cape Cod. In this work Dr. Lakeman is visiting every town in the district, making direct contact with the officers and directors of the many local associations, women's clubs and social groups, with due attention to the organizations of men. For the past fifteen years there has been an increasing realization of the necessity of caring for chronic diseases, and success has been achieved to the extent of adding about five years to the average human life.

Since 1925 legislation has been chiefly for large hospitals to care for older persons, and in 1926 a cancer division was added to the other State Health Department activities. Dr. G. H. Bigelow, the then Health Commissioner of Massachusetts, undertook the problem of proper development of the work, secured the advice of the cancer experts of the medical societies, men with wide experience, and in addition, undertook extensive local studies. One outcome was the realization of the fact that the malady often needs long care that hospitals cannot give. Boards of health were not brought into the matter at the time, but steps were taken to build up clinics, with some hospitals. There are eighteen such clinics today.

Especial reference was made by the speaker to a later work of research undertaken by Dr. Bigelow and Dr. Herbert L. Lombard, published in book form with the title, "Cancer and other Chronic Diseases in Massachusetts." In accord with the growing realization that education of the people is fundamental to progress, the State Department has devoted two of its recent bulletins to cancer, while the American Society for the Control of Cancer has done much toward interesting the health departments and the public in the subject.

The speaker sketched some of the problems presented by other chronic diseases, among them heart ailments, arthritis and diabetes. They all present some similarities, in that prevention is the modern resource of their elimination. Here Dr. Lakeman emphasized the importance of early discovery, the means for which include periodical medical examination. In cancer approximately half of all the cases are curable if recognized in time; but in cancer of the skin, a very large percentage will yield to treatment.

A campaign for the information of the "man on the street" is now underway, and by means of local groups, as already suggested. These should include professional groups like boards of health and medical societies as well as the lay professional business and social associations. There is now an earnest endeavor to interest the latter in organizing educational meetings, at which the medical men will provide facts and information. It is hoped that centres may be established with active leaders in all the towns. Thus public education in prevention and in general health may be promoted.

Mr. Bernard E. Bradley of the Cancer Division continued the general subject with facts and figures. Two difficulties of the day are delay in treatment and refusal to recognize the symptoms. Inasmuch as physicians in Massachusetts are caring only for a small ratio of the actual cases, it is necessary to bring the matter into the open and talk about it. Since the people have begun to understand about tuberculosis, the death rate has been very materially lessened. In cancer, likewise, the responsibility is on the people. There are facilities for treatment and care, but the patient should get this treatment in early stages of the disease.

Mr. Strawson voiced the greetings of the Massachusetts Tuberculosis League, and stated that clinics should be provided for promptly to the end that the plan under Dr. Chadwick's supervision should be carried forward. The people must be educated to full coöperation with existing facilities including sanatoria and clinics.

The meeting then resolved itself into a "round table", with free discussion, some of the participants being Dr. Richard P. MacKnight, State District Health Officer; Dr. E. F. Curry of Sagamore, Dr. A. P. Goff, County Health Officer, and Mr. Charles R. Stowers of the Falmouth Board of Health.

Mr. W. Fred Delano, health officer of Fairhaven, discussing the special subject of diphtheria, advocated the general immunization of school children, with the schools asking for information on this subject. Dr. Swift, reporting for Falmouth, noted that in 1930 and 1931, the deaths from diphtheria were thirty-eight and twenty-one, respectively, and in 1932, one. In 1933, 1934 and 1935 there were none. Dr. MacKnight, reporting for New Bedford, said that with a population of 110,000, the years 1934 and 1935 had no deaths from diphtheria.

HARVARD MEDICAL SOCIETY

The Harvard Medical Society met at the Peter Bent Brigham Hospital on January 28, 1936, Dr. J. C. Aub presiding. The medical case was presented by Dr. John Alsever: A forty-two year old housewife entered the hospital sixteen days previously complaining of tender nodules over her extremities of three days' duration. She had had five such attacks during the preceding twenty-four years, the last in 1930. The attacks always began with sore throat and diarrhea of two or three days' duration, followed by the development of skin lesions over the forearms and legs, which persisted for three or four weeks, and gradually disappeared. The attacks were accompanied by malaise, and generalized joint pains. Physical examination was negative except for a red, inflamed throat, and a skin rash over the arms, thighs, and knees. The skin lesions over the arms were red and erythematous, with irregular outline and sharp border. The nodular lesions were limited to the legs, and were acutely tender. Her temperature was moderately elevated, and the white blood count varied between 12,000 and 24,000. Other laboratory studies were essentially negative. The diagnosis of erythema nodosum and erythema multiforme was made. The nodules slowly regressed,

and became less tender, the joint pains subsided, and the rash over the upper extremities desquamated.

Dr. Fulton remarked that although the disease is spoken of as allergic, it is seldom possible to demonstrate specific hypersensitivity. It was impossible to do so in this case. The patient was illustrative of the type of recurrent erythema with visceral manifestations. The same type of process observed in the skin also occurs in the internal organs, with resultant varying symptoms; thus, signs suggestive of acute hemorrhagic nephritis, or renal colic have occasionally been described.

The surgical case was presented by Dr. Robert Bates: A fifty-one year old housewife entered the hospital seven days previously with the history of a lump in the right breast five years ago, at which time bilateral simple mastectomy had been performed. One year ago she began to experience vague aching pains in her back and legs which had progressed in severity, and which kept her confined to bed for the past six months. Physical examination showed a well-nourished woman in no acute pain resting quietly in bed. There were scars of the bilateral simple mastectomy, and in the right third interspace there was a hard nodule adherent to the skin and underlying tissues. There was acute pain on manipulation of the right hip, and muscular atrophy of the right leg. X-ray studies showed many of the ribs and vertebrae to be involved in a widespread destructive process, and there was a large area of destruction in the right ilium in the region of the hip joint.

Dr. Aub commented on the marked improvement shown by some patients with metastatic carcinoma of the breast after the production of artificial menopause. Dr. E. C. Cutler stated that patients past the menopause received no benefit from radiation of the ovaries.

Dr. Edgar Allen, Professor of Anatomy at Yale University School of Medicine, delivered the paper of the evening, speaking on "Reactions to Ovarian Hormones: Growth, Normal and Atypical, in Genital Tissues."

Both ovarian and testicular hormones are essential for the growth and maintenance of the genital tissues. Recently developed synthetic preparations are able to induce development and stimulate growth processes, replacing the endocrine function of the gonads.

So great is the growth stimulus furnished by the ovarian follicular hormones that by administering relatively small dosages to ovariectomized mice and rats the vaginal wall can be replaced with new epithelium within forty-eight hours. On withdrawal of the hormone there is an enormous leucocytic infiltration of the vaginal wall and a sloughing of all but a few basal layers.

Since normal growth processes of genital tissues are so greatly accelerated by estrogenic substances, it is conceivable that irregularities in the duration or mode of hormone action may result in the development of neoplastic processes. Various examples of excessive or atypical growths induced by estrogens were then illustrated.

During pregnancy the vaginal epithelial cells of rodents are loaded with mucus and are of an appearance entirely different from that observed in epithelium under theelin stimulation. By injection of theelin in doses one-third that used to produce estrus, a picture similar to that observed in pregnancy can be produced.

Smith and Engle, by implants of anterior pituitary, produced an excessive number of active Graafian follicles, an increased secretion of theelin, and hyperplasia of the uterus,—demonstrating the anterior pituitary's influence on the ovary. The ovary also influences the pituitary. In ovariectomized animals there is an increase in the basophilic elements of the pituitary, which returns to normal after injections of theelin.

Gillie's theory, explaining the freemartin, postulated the restraining influence exerted on the ovaries by the hormone secreted by the testes of the male twin which develop at an earlier time than the ovaries. This restraint results in the sterility of the female.

As a test of this theory, injection of ovarian extracts into incubated eggs (genetic males) has produced development of Müllerian rudiments in male embryos. Injection of potent extracts into male chick embryos has caused not only a swing toward female characteristics, but has caused the development of an ovarian cortex in the male gonad; and example of true "sex reversal" (Willier).

Injections of theelin into monkeys cause growth of the uterus with great mitotic activity in the surface epithelium and glands. Injections of corpus luteum hormone cause rapid changes in the endometrium,—the disappearance of mitotic activity and transformation of glands to the premenstrual type.

The junction between the stratified and columnar epithelium of the cervix is a point of physiological "weakness", and it is here that carcinomatous changes frequently occur in the human female. Injection of large amounts of theelin into monkeys, with or without traumatizing the cervix, will result in metaplasia of cervical glands,—a stratified epithelium developing beneath the columnar epithelium in a fashion suggestive of malignant change (Overholser and Allen). This type of metaplasia has been prevented by injections of corpus luteum hormone (Hisaw). In women at the menopause there is cessation of ovulation and corpus luteum formation, with a persistence of theelin secretion. It is possible that this endocrine unbalance may be a factor in the development of cervical neoplasms, although the long latent period between the action of the stimulus and the appearance of the cervical tumor is not easily explained.

The genital swelling of the chimpanzee, and the "sexual skin" of the Macacus monkey can be stimulated to extreme development by prolonged injections of theelin. Swelling and wrinkling of the skin of large areas of the body may be produced by extreme dosages (Bachman et al.), and histological

inspection of the subcutaneous connective tissue shows a mucoid change, similar to that observed in the cock'scomb following injections of the male sex hormone.

Long-continued injections of folliculin benzoate into male mice caused the development of scrotal herniae, overgrowth and distention of the bladder, hydronephrosis, and ligamentous replacement of the symphysis pubis. Similar injections into female mice resulted in death due to overgrowth of the uterus, subsequent breakdown, and fatal peritonitis. The changes observed in the symphysis pubis following these injections are of interest. There is an actual decrease in size and weight of the pelvic bones, and an active proliferation of periosteal cells. The joint cavity is obliterated and the symphysis replaced by a ligament (Gardner).

Studies of the mammary glands have shown that there is marked growth of the mammary tree as a result of theelin stimulation. In the rabbit the corpus luteum hormone is necessary for growth of the alveoli, but such growth occurs in the guinea pig under the stimulus of theelin alone.

By means of ovarian transplant in male mice of cancer susceptible strains, or with injections of a concentrated estrogenic hormone, overgrowth of the mammary rudiments of the male has been produced (Lacassagne, Gardner). Atypical growths appear in the form of multiple nodules and hyperplastic areas persist after the withdrawal of the hormonal stimulus. Some of the animals actually develop carcinoma of the mammary gland. These tumors have been transplanted in males as well as in females and continue to grow without further hormone treatment. Genetic factors for cancer are present in these mice but the males do not have mammary carcinoma because of absence of the ovarian hormone necessary for mammary development. Six animals have also developed sarcomata at the sites of injection.

Several instances of multiple tumors in physiologically related tissues have been observed. One animal with a chromophobe adenoma of the anterior lobe of the pituitary fourteen times the weight of the normal gland also had granulosa cell tumors of both ovaries, extreme hyperplasia of the uterus, and multiple (six) mammary cancers.

Dr. Fuller Albright in commenting on the paper questioned whether mammary acini could be caused to develop from injection of estrin alone in pituitarectomized animals, since estrin induces the production of a corpus luteum-like hormone from the pituitary, which might be responsible for the stimulation of the acinar elements. Dr. Allen replied that in the guinea pig complete development of the mammary tissue may be produced by theelin alone.

Dr. J. C. Aub emphasized the fact that so far experimental neoplasms have been produced only in highly susceptible strains of animals, and that conclusions from these experiments should not be applied as yet to general problems of neoplastic diseases. Dr. Allen agreed with this view, but remarked that sarcomata have been produced in strains of animals not susceptible to this particular tumor and that further experiments with high doses of estrogens and carcinogens looked promising.

Dr. John Rock emphasized the distinction between endocrinology and organotherapy, and pointed out that experimental findings in animals must not be applied too freely to clinical fields.

Dr. F. L. Hisaw stated that the interreaction of follicular and corpus luteum hormones was peculiar, since the simultaneous action of the two on the endometrium causes greater proliferation than is obtained by either alone. Prolonged action of estrin for a period of some twenty days at high dosage levels results in a cessation of mitotic activity which may necessitate a revision of conclusions drawn from endometrial biopsy material.

SUFFOLK DISTRICT MEDICAL SOCIETY AND THE BOSTON MEDICAL LIBRARY

Joint Meeting

A joint meeting of the Suffolk District Medical Society and the Boston Medical Library was held at the Library on Wednesday evening, January 29. Dr. Walter B. Cannon, George Higginson Professor of Physiology at Harvard Medical School, was the speaker for the evening. Dr. Cannon delivered a very delightful and interesting address on some of his experiences in his trip around the world. He went west via Hawaii to fulfill an engagement as visiting Professor of Physiology in Peiping, crossed Siberia to attend last summer's Physiological Congress in Leningrad, and then returned to America via Scandinavia and Scotland.

Dr. Cannon mentioned the very active medical society of Honolulu, and said that this congenial group is always on the lookout for medical men visiting Hawaii, so that a meeting and speeches can be arranged. The speaker was seven weeks in China, visiting Shanghai, Nanking, and the remainder in Peiping. Everywhere there were enthusiasm, new projects, and new buildings. The great inventiveness of the Chinese was contrasted with a certain primitive simplicity which seemed at times almost pathetic. A graphic description of Peiping's dust-laden streets, filled with venders and hawkers, was given. The city boasts a first-rate Medical School, with teachers and research men trained in the best laboratories in the world. Fifty per cent of the graduates go into public service work, the greatest need in China today. The wooden houses, and cleanliness and trimness of Japanese villages, were contrasted with the mud-made villages of China, as Dr. Cannon talked of his three weeks' visit to Japan.

Most of the evening, however, was devoted to an account of conditions in the Soviet Union. The complete femininity of the slightly-built women of Japan was contrasted with the strong, toughened, hard-working character of the women seen on arrival in Vladivostok. Eight days' journey across Siberia in hot July was next described—flies every-

where; dull, drab dress; small, infrequently-placed buildings; and many prison-camps and working prison-gangs. In Russia itself, women were working in foundries and factories on the same jobs as men. Propaganda was ubiquitous and omnipresent—statues of Marx, and of Lenin and Stalin, red banners of exhortation, filled the streets and squares, as everyone talked of "the new life" and "the new state". Great industrial activity has been coupled with tremendous inefficiency. Several amusing anecdotes concerning late trains, inaccuracy of hotel registers, etc., were told. Ten days were spent in Moscow and one week in Leningrad. Communism in the strict literal sense of the word was found not to exist. There is variation in position and variation in remuneration, and some things (e.g., a man's house and its contents) are "private property", though the land belongs to the state. Even on the collective farms the farmer can use his two acres, his pig, and his chickens as he pleases. There is construction everywhere, not always well done, as this previously agricultural people turns toward industrialism; and often the new machines are handled in the most inept manner. The high regard for the human factor in labor was most impressive. The work day is six hours long, with every sixth day a day of rest. If the job is an especially hard one, a five-hour day and rest day every five days are obtained. Summer camps for children, and vacation resorts for working people, are found outside the large cities; and "parks of culture and rest", providing all forms of entertainment, recreation, games, and rest, are established in the centers of the large cities. Gifted children are selected and given special attention in their schooling, and in the universities and graduate schools the student is paid according to his work, and dismissed if it is not satisfactory. The whole nation is air-minded, and parachute-jumping and gliding are major sports. Among other interesting places visited were a self-supporting, self-governing Criminal Commune, churches now closed and used as schools or museums, and an Abortorium. In connection with the great scientific and industrial progress, many neuroses have been encountered in medical work. Private medical practice is possible, but only after the payment of a high license fee. The visitor oscillated between his enthusiasm for the achievements attained in this great country and his revulsion at the state despotism which handles, moves, and removes people without regard for individual liberty, right, and freedom. It is certainly true that fear exists widely, though the socialist idea is winning inside the country and among the youth of the state.

Time did not permit Dr. Cannon to recount more of his fascinating observations, and the meeting was adjourned shortly after ten o'clock.

BOSTON SOCIETY OF BIOLOGISTS

The January meeting of the Boston Society of Biologists was held on the fifteenth at the Children's Hospital. Dr. Robert S. Harris presented the first paper on the subject of "The Rôle of Chlorophyll in Hemoglobin Regeneration in Experimental Anemia." Hemoglobin, cytochrome, and chlorophyll all have a similar chemical structure, the element magnesium holding the same central position in chlorophyll as iron does in hemoglobin. Experimental anemia was produced in white rats by feeding a special diet and then unpurified chlorophyll and chlorophyll derivatives were mixed with the diet and the hemoglobin regeneration effect studied. Of the several crude compounds used the best effect was secured by feeding iron phaeophytin. It was also found that all of the compounds had a greater regenerative power when fed with an iron salt, and that the total effect was greater than the sum of the effects of the iron and chlorophyll compound alone. Highly purified potassium chlorophyllin, when fed in 20-30 milligram doses daily, had a marked effect. Small traces of copper (about 7 parts per million) were present in this preparation, but no iron. Phytol, chlorine and rhoding, all derived from the chlorophyll molecule and carotene usually absorbed on to chlorophyll, had no effect. Doctor Harris felt that these findings indicate that at least half of the regenerative power of chlorophyll preparations reported in the literature is due to metal impurities. Although bile pigment augments the effect of iron in the human being, as does also chlorophyll, in the rat this pigment had no effect.

Dr. H. Sulkowitch with Dr. Fuller Albright spoke on "Factors Influencing the Determination of Pituitary Gonotrophic Substances in the Urine." The prolan A of castrate urine and that of pregnancy urine are probably not identical. It was found in routine determinations of prolan that the more acid preparations were often negative. A study was therefore undertaken to determine the effect of varying pH values on the amount of prolan found. At the lower values for pH much less prolan was found; an excess of ammonium hydroxide could be used without harm; but sodium hydroxide tended to destroy the hormone. It was also discovered that prolan is very stable and may be stored for long periods of time without loss of potency.

Dr. George B. Wislocki spoke on "The Anatomy of the Pituitary Body of Whales", work in progress jointly with Dr. E. M. K. Gerling. In whales the neural portion of the gland is entirely separate anatomically from the anterior lobe and lies in an independent pocket of dura. Although the neural portion appears to be made up solely of glial-like tissue, extracts from it produced pressor and oxytocic effects. Intermedin can be isolated from the anterior lobe, but no intermediate tissue can be seen microscopically. The whale's pituitary lies in a cushion of dural tissue which is very vascular and is essentially composed of arterial and venous retia. The pia-arachnoid, much more massive than in most mammals, partially surrounds the neural lobe but not the anterior lobe. The absence of any

intermediate tissue indicates that the usual supposition that the posterior lobe secretions really are elaborated by the intermediate portion is false. Several varieties of whale's pituitaries were shown on slides. It was pointed out that in the whale the pituitary is relatively small compared with the rest of the body.

SUFFOLK DISTRICT MEDICAL SOCIETY

8 Fenway
Wednesday, April 29, 1936, at 8:15 P.M.
At the Boston Medical Library

ANNUAL MEETING

The Treatment of Septicemia. Champ Lyons, M.D.

The Pleurality of Scarlatinal Streptococcus Toxin. Sanford B. Hooker, M.D.

Discussion: Dr. Hans Zinsser.

Refreshments.

CHARLES C. LUND, M.D., *Secretary.*

BOSTON MEDICAL HISTORY CLUB

8 Fenway
Tuesday, April 21, 1936, at 8:15 P.M.
At the Boston Medical Library

Syphilis and Sassafras. Merrill Moore, M.D.

Jacob Bigelow, M.D.—An outstanding example of the practitioners in a pre-scientific age. Charles F. Painter, M.D.

Navajo Indian Medicine. Leland C. Wyman, Ph.D., Associate Professor of Physiology, Boston University School of Medicine.

BENJAMIN SPECTOR, M.D., *Secretary.*

NEW ENGLAND PHYSICAL THERAPY SOCIETY

The regular meeting of the New England Physical Therapy Society will be held at the Hotel Kenmore, Boston, on Wednesday evening, April 15, 1936, at 8 o'clock.

PROGRAM

Physical Therapy in Dermatology. E. Lawrence Oliver, M.D., Boston, Professor of Dermatology, Harvard Medical School.

Discussion. William P. Boardman, M.D., Boston, Chief of the Department of Dermatology, Boston City Hospital.

The Council will meet promptly at 6 o'clock.

An informal dinner will be served to members and guests in the main dining room of the Kenmore at 6:30 P.M.

All members of the medical profession will be cordially welcome at the meeting and the dinner.

WILLIAM D. MCFEE, M.D., *Secretary.*

41 Bay State Road,
Boston, Mass.

SOUTH END MEDICAL CLUB

The next regular meeting of the South End Medical Club will be held at the office of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, April 21, 1936, at 12 noon. The speaker will be Karl R. Bailey, M.D., Deputy Commissioner of the Bacteriological Laboratory, Boston Health Department. His subject will be "Public Health in Laboratory Work." All physicians are cordially invited to attend. Luncheon will be served.

HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheatre (Shattuck Street Entrance), Tuesday evening, April 14, at 8:15 P.M.

PROGRAM

Presentation of Cases.

Medical Inheritance. By Dr. Reginald Fitz.

Medical students and physicians are cordially invited to attend.

MARSHALL N. FULTON, M.D., *Secretary.*

BRISTOL NORTH DISTRICT MEDICAL SOCIETY

The Bristol North District Medical Society will hold its Annual Meeting at Hotel Taunton on April 16, 1936, at 6 P. M. Dr. E. Lester Merritt of Fall River is to be the speaker.

C. B. KINGSBURY, M.D., *Secretary.*

THE ARLINGTON DOCTORS' CLUB

The regular meeting of the Arlington Doctors' Club will be held in the Nurses' Home of the Symmes Arlington Hospital on Tuesday evening, April 14, 1936, at 8:30 P.M.

The speaker will be Dr. Lewis M. Hurxthal of the Lahey Clinic.

His subject will be Clinical Endocrinology.

The talk will be supplemented by moving pictures.

All physicians are cordially invited to attend.

FRANK H. GERRY, M.D., *President,*
SIDNEY M. SIMONS, M.D., *Secretary*

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, APRIL 13, 1936

Tuesday, April 14—

*9-10 A.M. Boston Dispensary, 25 Bennet Street, Boston. Etiological Factors in Anemia. Dr. William Dameshek.

2:30 P.M. Pediatric Ward Visit. Massachusetts Eye and Ear Infirmary.

*8:15 P.M. Harvard Medical Society. Peter Bent Brigham Hospital Amphitheatre (Shattuck Street Entrance).

Wednesday, April 15—

*9-10 A.M. Boston Dispensary, 25 Bennet Street, Boston. Hospital Case Presentation. Dr. S. J. Thannhauser.

†12 M. Clinico-Pathological Conference. Children's Hospital.

*6:30 P.M. New England Physical Therapy Society. Hotel Kenmore, Dinner. 8 P.M. Scientific Program.

Thursday, April 16—

*8:30-9:30 A.M. Clinic, Surgical and Orthopedic Staffs of Children's Hospital, at the Children's Hospital.

*9-10 A.M. Boston Dispensary, 25 Bennet Street, Boston. Seasonal Hay Fever. Dr. Joseph Kaplan.

*3:30 P.M. Medical Clinic at the Peter Bent Brigham Hospital.

Friday, April 17—

*9-10 A.M. Boston Dispensary, 25 Bennet Street, Boston. Recent Observations on the Use of Protamine Insulinate. Dr. Alexander Marble.

*12 M - 1 P.M. Boston University School of Medicine Surgical Clinic at the Boston City Hospital, Cheever Amphitheatre.

Saturday, April 18—

*9-10 A.M. Boston Dispensary, 25 Bennet Street, Boston. Hospital Case Presentation. Dr. S. J. Thannhauser.

*10-12. Staff rounds at the Peter Bent Brigham Hospital.

*Open to the medical profession.
†Open to Fellows of the Massachusetts Medical Society.

April 9—Greater Boston Medical Society. Auditorium Beth Israel Hospital, 8:15 P.M.

April 10—William Harvey Society. Beth Israel Hospital. 8 P.M.

April 10, 17, 24—Thomas William Salmon Memorial Lectures. See page 660, issue of March 26.

April 13-28—Calendar of Lectures. See page 754.

April 14—Harvard Medical Society. See page 760.

April 14—Arlington Doctors' Club. See page 760.

April 15—New England Physical Therapy Society. See page 760.

April 16—Medical Clinic, Peter Bent Brigham Hospital. See page 755.

April 17—Boston University School of Medicine Surgical Clinic at the Boston City Hospital. See page 754.

April 20-24—A Postgraduate Institute in Philadelphia. See page 497, issue of March 5.

April 21—Boston Medical History Club. See page 760.

April 21—South End Medical Club. See page 760.

April 27—Springfield Medical Association, 8:30 P.M. at the rooms of the Springfield Academy of Medicine, 20 Maple Street. The Development of Non-Surgical Specialties. Dr. Allen S. Johnson. The Development of Surgical Specialties. Dr. Eugene W. Beauchamp.

May 1, 2, 3, and 4—The American Association on Mental Deficiency. See page 610, issue of March 19.

May 11—American Medical Golfers Play in Kansas City. See page 710, issue of April 2.

May 12—American Heart Association, Inc. See page 712, issue of April 2.

May 12-16—The International Congress of Physical Medicine. See page 443, issue of February 27.

May 31 - June 1—International Cardiological Meeting, Royat (Auvergne) Assembly of Physiologists, Pathologists and Therapeutists. See page 754.

June 15-19—The Executive Board of the Catholic Hospital Association will meet at the Fifth Regiment Armory, Baltimore, Md.

June 16-July 28—Summer Course in Bacteriology. See page 385, issue of February 20.

September, 1936—First International Conference on Fever Therapy. See page 1325, issue of December 26, 1935.

September 7-10—International Union against Tuberculosis. See page 554, issue of March 12.

October 19-23—Clinical Congress of the American College of Surgeons. See page 180, issue of January 23.

DISTRICT MEDICAL SOCIETIES

BRISTOL NORTH DISTRICT MEDICAL SOCIETY

April 16—See page 760.

ESSEX SOUTH DISTRICT MEDICAL SOCIETY

May 7—Thursday. Censors' Meeting.

May 13—Wednesday. Annual Meeting. Salem Country Club. Dinner at 7 P.M. Speaker: Dr. Paul White. Subject to be announced later.

R. E. STONE, M.D., Secretary.
88 Lothrop Boulevard, Beverly.

FRANKLIN DISTRICT MEDICAL SOCIETY

May 12—Weldon Hotel, Greenfield, at 11 A.M.

CHARLES MOLINE, M.D., Secretary.
Sunderland.

MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

May 6—Bear Hill Golf Club, Stoneham, at 12:15 P.M.

K. L. MACLACHLAN, M.D., Secretary.
1 Bellevue Avenue, Melrose.

NORFOLK DISTRICT MEDICAL SOCIETY

May—Annual Meeting. (Place, date and subject to be announced.)

The censors meet for the examination of candidates: May 7, 1936; November 5, 1936.

FRANK S. CRUICKSHANK, M.D., Secretary.
1236 Beacon Street, Brookline.

PLYMOUTH DISTRICT MEDICAL SOCIETY

April 16—Brockton Hospital.
May 21—Lakeville State Sanatorium.

G. A. MOORE, M.D., Secretary.
167 Newbury Street, Brockton.

SUFFOLK DISTRICT MEDICAL SOCIETY

April 29—See page 760.

ROBERT L. DeNORMANDIE, M.D., President,
CHARLES C. LUND, M.D., Secretary.

WORCESTER DISTRICT MEDICAL SOCIETY

May 7—Censors' Meeting. See page 713.

May 13—Wednesday afternoon and evening. Annual Meeting of Society. Time, place and details of program to be announced.

ERWIN C. MILLER, M.D., Secretary.
27 Elm Street, Worcester.

WORCESTER NORTH DISTRICT MEDICAL SOCIETY

April 22—Burbank Hospital, Fitchburg.

BOOK REVIEWS

Mechanics of Normal and Pathological Locomotion in Man. Arthur Steindler. 424 pp. Springfield and Baltimore: Charles C Thomas. $8.00.

It is unlikely that a more scholarly book dealing with this important and neglected subject will appear in the English language for many decades. To appreciate fully its significance, a greater knowledge of higher mathematics and experimental physiology is required than the average physician possesses, but the evidence which this volume presents of Steindler's erudition, voluminous reading and clear thinking is amazing. It should be consulted as a book of reference by everyone who essays to write on any subjects in which human kinetics and skeletal functions are involved.

Its four hundred and twenty-four pages are divided into thirty chapters. Short Chapter I relates the history of the mechanics of the locomotor system from the ancients to Albrecht von Haller, and from von Haller to the present day: an education in itself. The second and third chapters are very technical and most readers will be unable to grasp more than the general significance of the mathematical equations employed to prove the points made.

Chapter IV, on the Centre of Gravity, applies the conceptions of the preceding chapters to locomotion in animals and man. Locomotion appears to be the result of partial loss of equilibrium followed by a partial or complete regaining of equilibrium. "The

rhythmic play of muscle forces between loss and recovery of equilibrium."

Chapter V deals with the physical properties of bone and Chapter VI with the dynamics of muscle action.

In Chapter VII, the "Pathomechanics" of muscle are discussed and their practical application to the types of contractures characteristic of the different types of muscle structure and insertion. It is possible with this knowledge to discover the "key" contracture about a joint which must be first overcome if the given deformity is to be corrected.

An electrophysical analysis of normal and pathological muscle action is given in Chapter VIII. The action currents and types of motion in normal muscles are compared with those in anterior poliomyelitis, progressive muscular dystrophy, cerebral palsy, epilepsy and in muscles about ankylosed joints.

In Chapter IX, the coördination of skeletal muscle action is discussed. Mass resistance and external resistance are considered in relation to uniarticular, biarticular and pluriarticular muscles. Illustrations are given of the interesting phenomenon of a given muscle functioning at one stage of its range of motion as a flexor and at another stage as an extensor.

Chapter X is entitled "Fatigue and Recovery." The treatment and prevention of fatigue and the technique of exercise are described. The influence of the endocrine glands, of atmospheric pressure in high altitudes and of intra-abdominal pressure with resultant shallow respiration and stagnation of the blood in the abdominal veins are discussed as examples of the pathomechanics of fatigue.

Part II, the Special Mechanics of Locomotion, begins with Chapter XI, which will be of special interest to orthopaedic surgeons, indeed a small treasure house of knowledge. In this chapter consideration is given to the functional anatomy of the spine, to its external landmarks and to general postural laws. The statics of the spine from the point of view of its internal architecture, its articulations and its shock absorbing discs are elucidated.

Chapter XII continues with a description of the dynamics of the spine both as to the distribution of motion and muscle action. This is an extremely valuable contribution to our knowledge of the details of both individual and combined action of the spinal muscles.

There follow Chapter XIII on the pathomechanics of the spine dealing chiefly with anatomic variations, and Chapter XIV, into which is crowded the mechanics of the pelvis, including morphology, orientation, statics and pathomechanics.

Chapter XV deals with the mechanics of respiration and with the anatomy, physiology of the thorax, and with its pathomechanics and the paralytic disturbances of the breathing mechanism.

In Chapter XVI, the abdominal cavity is considered under headings of (1) Morphology, (2) Strains and stresses in the abdominal cavity, (3) Muscle mechanics of the abdominal wall, (4) Support of the intra-abdominal organs, and (5) Abdominal respiration.

In Chapter XVII, the mechanics of posture are discussed. Normal posture (in geometrical terms) according to Steindler "means compensation of the spinal deflection within the spine itself; mal-posture means that a deflection of the spinal column in relation to the line of gravity is compensated by the body as a whole by means of abnormal positions of the pelvis and hips and knees." This quotation may serve to illustrate the meticulousness of Steindler's anatomical and physiological descriptions. He quotes Goldthwait extensively in relation to the importance of recognizing the common types of body build and emphasizes as well the part which changes in the intervertebral discs play in youth and old age in the determination of postural deformities.

Steindler is quite "at home" in Chapter XVIII, the title of which is "The Pathomechanics of Scoliosis." He propounds his rational theory of the functional value of compensatory curves and pleads for a much earlier recognition than is now generally afforded of the prescoliotic stage.

The next eight chapters, XIX to XXVII, take up in most full and helpful manner the individual mechanics of the main articulations, namely, those of the hip, knee, ankle and foot, the lower extremities as a whole, the shoulder, elbow, wrist and fingers, and the arm as a whole. Chapters XXVIII and XXIX offer respective considerations of "The Mechanics of the Human Gait," "Graphic Description of the Gait," and "Pathomechanics of Gait."

The concluding Chapter XXX is entitled, "Rationalization of Work in Locomotion." By rationalization is meant "the adaptation of motion to the individual work in such a manner as to produce the highest possible quotient of efficiency".

"The Mechanics of Normal and Pathological Locomotion in Man" should not be read hastily, indeed, cannot be read hastily with any profit. It is "heavy going" but the weightiness of the subject justifies the reader in proceeding slowly. If one does proceed thus slowly he will be likely to arrive at the same conclusions as the thoughtful and erudite Professor Steindler. The book is well written, well illustrated and well indexed. It is an excellent piece of bookmaking.

National Medical Monographs. Industrial Medicine. W. Irving Clark and Philip Drinker. 262 pp. New York: National Medical Book Company.

This book fills a long-felt need. It describes clearly and succinctly the objectives to be attained by industrial medical service; clearly defines the functions of the industrial physician; the methods and means by which medical services in industry may achieve the optimum of practical utility. The sections on physical examinations, industrial surgical service and pneumoconiosis are excellent. The book may be read and studied with profit by all whose medical practice brings them in contact with workers.